Approved per signature page

SERVICE MODULE

MEDICAL OPERATIONS (MO)

BOOK 2

MEDICAL MONITORING

SM

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2-29E	-20-Oct-00	3-61E	-25-Sep-00	5-14E	-25-Sep-00
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For notes

For notes

ACRONYMS AND ABBREVIATIONS

АД	- arterial blood pressure
Б/И	- crew procedure
БП	- power supply unit
ВАП	- venous-arterial pulsogram
ВБ	- cycle ergometer
ВКЛ	- activate
ВПГ	- temporal pulsogram
ВЫКЛ	- deactivate
ГИ	- impulse generator
ЗАКР	- close, to close
ИМ	- mass measurement device
ИМТ	- body mass measurement
ККГ	- kynetocardiogram
ОДНТ	- lower body negative pressure, LBNP
ОТКЛ	- deactivate
ОТКР	- open, opened
ПИТ	- power
ПВК	- LBNP prophylactic system
ПКО	- biomed harness
ПМО	- medical exam panel
ППС	- systems power panel
ПУ	- control panel
РБС	- onboard power outlet
РМ	- workstation
РПГ	- rheogram
РЭГ	- rheoencephalogram

СЛГ - personal hygiene articles

ТНК - training-loading suit

УСИ - sensor unit
УС - Matching Unit
УСВ - MASS MEASUREMENT PANEL

ЦИ - digital indicator

ЧСС - heart rate
ЧП - pulse rate

ШКО - biomed cap

ЭКГ - electrocardiogram, ECG

ДнаЗ - **Report to MCC**
ДпоУЗ - **√MCC**

кан - channel
кн - pushbutton, pb
кбл - cable
клав - pushbutton, pb

max - highest value, maximum

п - section
пан - panel
перекл - switch, sw
поРЭ - crew preference
поУЗ - **on MCC GO**

рзм - connector
р/г - radiogram
Рис - figure

СвД - led
с/с - comm pass
стр - page
сх - schematic, diagram

Табл - Table

	- illuminated
	- not illuminated
	- blinking
	- illumination status changes when command is issued
	- rotate clockwise
	- rotate counterclockwise
	- rotate clockwise to stop
	- rotate counterclockwise to stop
	- place physical device in designated state
	- connect
	- disconnect
	- up(wards)
	- down(wards)
	- sw → On (i.e. up relative to label on panel)
	- sw → Off (i.e. down relative to label on panel)
	- press pushbutton
	- press pushbutton to lock
	- press pushbutton to release
	- verify
	- verify aurally
√	- check (in case of discrepancy, attempt a corrective action one time only)
12:35:20	- hr, min, sec
00:30:00	- min
00:00:10	- sec
00:35:20	- min, sec
03:00:00	- hr
00:05:00	- min
00:00:08	- sec
P	- pressure
T.0	- AOS time
T.KTM	- LOS time
**********	- an anticipated off-nominal situation, if the condition left of the asterisks
**********	on the same line is not met, perform action(s) enclosed by asterisk lines
**********	
********** Sect. 5	- an anticipated off-nominal situation, if the condition left of the asterisks on the same line is not met, proceed per indicated reference
********** **√MCC**	- an unanticipated off-nominal situation, if the condition left of the asterisks on the same line is not met, halt procedure execution and **√ MCC**

1. GENERAL INSTRUCTIONS

These Medical Operations crew procedures are intended for trained crew members who have completed the full training course and simulations

These crew procedures may be updated pending systems modifications and procedure validation sessions

1.1. CREW RESPONSIBILITIES

While performing operations, the crew is responsible for the following actions:
Perform operations per these crew procedures
◅ systems and equipment operation
Report to MCC completed operations and performance of systems and equipment

In the event of system or instrument malfunction, crew is responsible for the following actions:
power down the failed hardware (if necessary)
record the time when the deviation (malfunction) was detected
record the nature of the deviation (malfunction)
Report to MCC

1.2. CREW PROCEDURES WORKING SEQUENCE

Obtain source data from **MCC**
◅ sufficiency of the received data
Schedule a command output sequence (if necessary)
Perform setup steps
Perform the indicated actions, while monitoring systems operation
Perform closeout steps
Measurement results should be entered into Laptop or recorded in corresponding tables provided in the crew procedures
Prepare a report:
on completion of tasks
on any detected peculiarities or deviations (with a time stamp)

For notes

2. COUNTERMEASURES

The following countermeasures are used for prevention of the negative effect of microgravity:

1. Physical training on Treadmill and Cycle Ergometer; also, physical exercises using Chest Expander (see MO Book 1 Sect. 5.5 p.5-21) and Training-Loading Suit (see MO Book 1 Sect. 5.3 p.5-9)

2. Myoelectrostimulation

3. LBNP training in the Chibis suit

4. Random muscular exertions

5. Use of Penguin-3 suit (see MO Book 1 Sect. 5.2 p.5-5), Kentavr suit (see MO Book 1 Sect. 5.8 p.5-31), Braslet cuff (see MO Book 1 Sect. 5.1 p.5-1)

6. Use of pharmaceuticals

2.1. TRAINING ON CYCLE ERGOMETER

2.1.1. OPERATION SEQUENCE

PRIOR TO TRAINING:

1. Install cycle ergometer to working configuration (see MO Book 1 Sect.5.4.1 p. 5-15 – 5-17)

2. Don sports clothes and shoes

3. Temp stow chest expanders in cycle ergometer area

4. Adjust generator assembly and seat positions:
   Pull fixer latch sleeve on the required rod in the arrow direction
   Adjust generator assembly or seat position as convenient
   Release fixer latch sleeve
   Move generator assembly or seat position until captured (wait for audible click)

FOOT PEDALING MODE:

5. Get into cycle ergometer seat
   Put feet in pedal toe clips
   Secure with belts

6. Use Cycle Ergometer per PHYSICAL TRAINING procedure (see Figure 2.1 - Figure 2.3 pp. 2-3 - 2-5)

ARM PEDALING MODE:

7. Remove pedals by pressing on fixer latch
   Stow pedals in pocket on seat cover
   Use Cycle Ergometer per PHYSICAL TRAINING procedure (see Figure 2.1 - Figure 2.3 pp.2-3 - 2-5)

AFTER TRAINING:

8. Unfasten belts
   Remove feet from toe clips
   Leave cycle ergometer
   Record current training results in log sheet (see p. 2-7)

9. Stow chest expanders
   Doff sports clothes and shoes in order to be dried
   Stow cycle ergometer under panel 121 (see MO Book 1 Sect. 5.4.3 p.5-18)

10. Perform hygiene routines

Cycle ergometer program 1

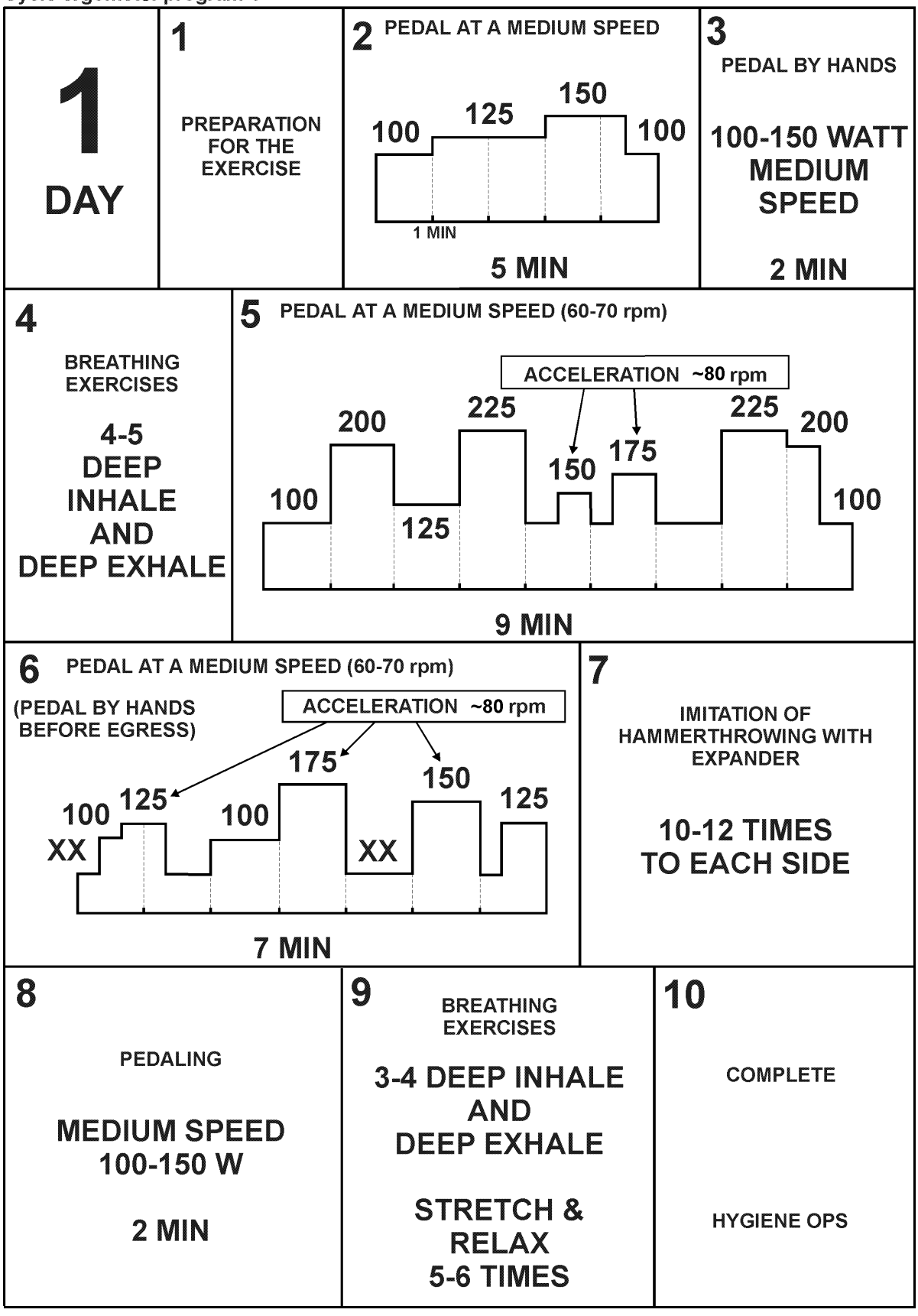


Figure 2.1

Cycle ergometer program 1

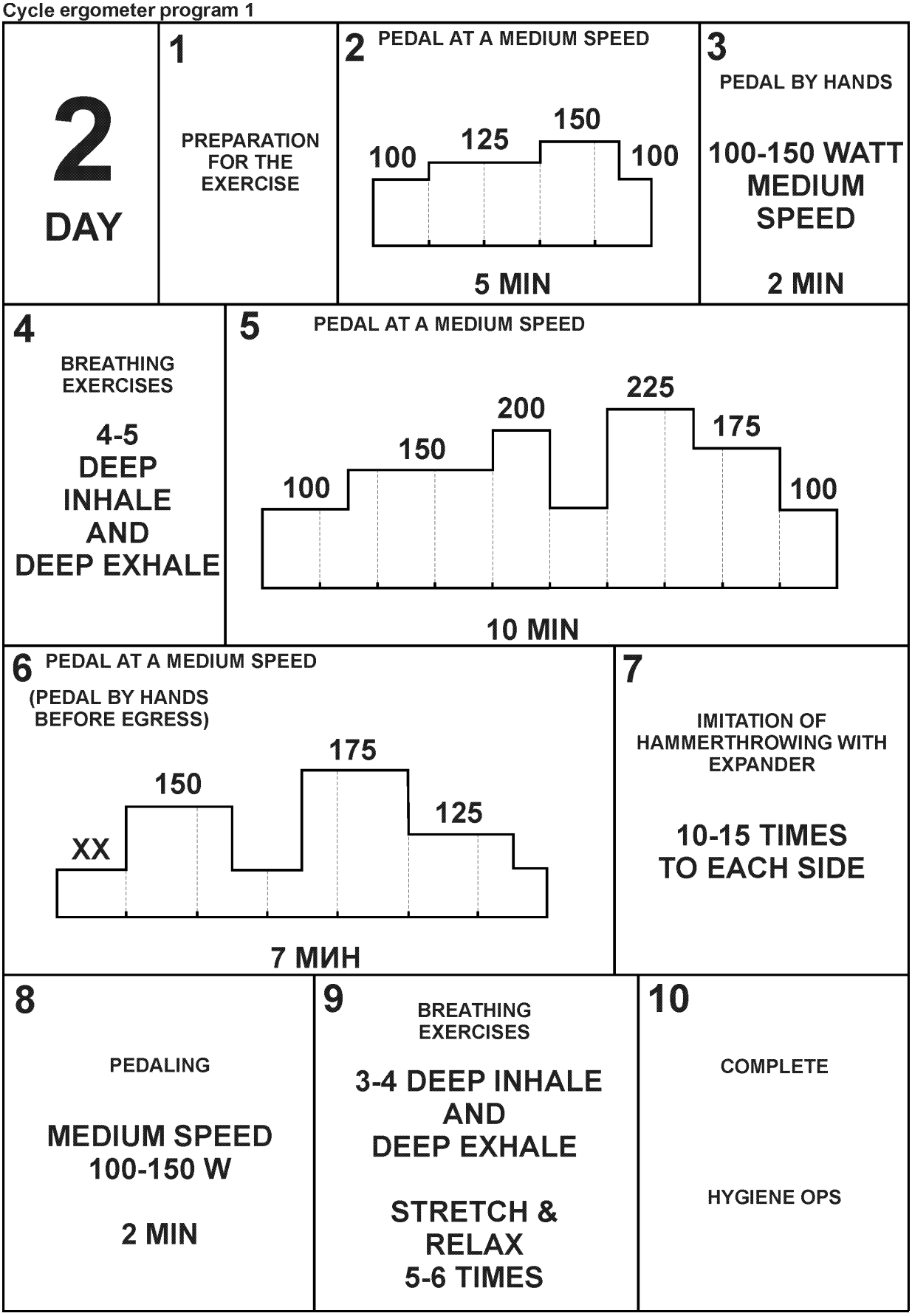


Figure 2.2

Cycle ergometer program 1

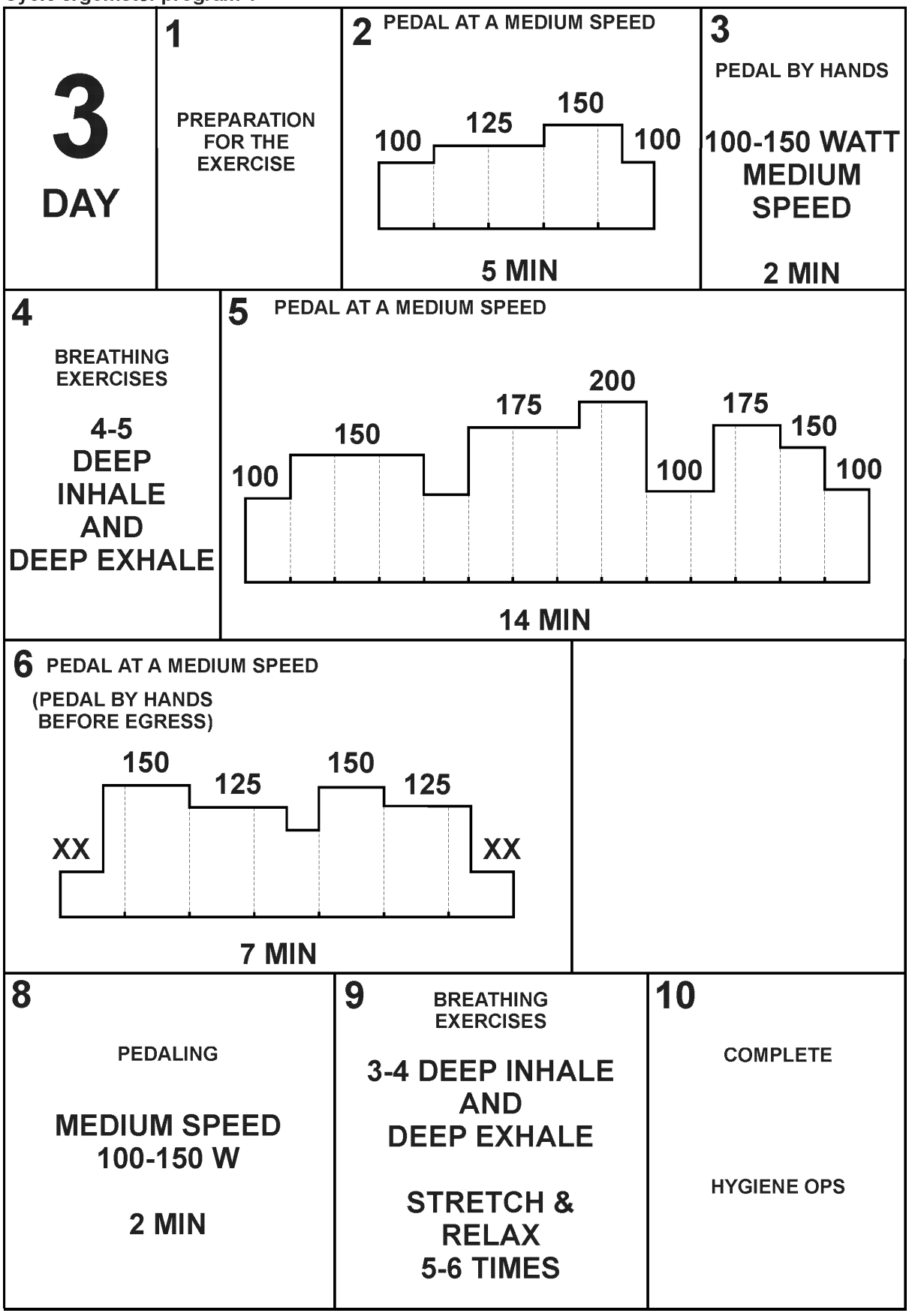


Figure 2.3

For notes

Log Sheet

Date	Name	Total Work	Total Training Time

Log Sheet

Date	Name	Total Work	Total Training Time

For notes

2.2. MYOELECTROSTIMULATION

2.2.1. MYOELECTROSTIMULATION IN ACUTE PERIOD

ППС-24

1. ⏻ TONUS MED SYS

2. Secure Subject next to Tonus equipment

3. Apply electrodes to thigh and trapezoid muscles (see diagram on the equipment)

<TONUS> IMPULSE GENERATOR

4. connector Ш1 of cable 2 →|← connector OUTPUT
connector of cable 2 →|← trapezoid electrodes connectors per decal

<TONUS> IMPULSE GENERATOR

5. Move knobs 1- 6 (all) to leftmost position
sw OPERATIONAL MODE → ⎍⎍⎍ (rapid contractions)
sw PROGRAM → IV
⏻ PWR

6. Gradually turn knobs 4 and 5 to the right until pronounced muscle contractions will occur
Stimulate muscles for 10 min

7. When muscles become adapted and stop contracting, gradually turn knobs 4 and 5 more to the right until pronounced muscle contractions will reappear

8. Continue stimulation of trapezoid muscles for 5-10 min

NOTE

In the event of unpleasant sensations under the electrodes or if there are no stimulated muscle contractions, turn knobs 4 and 5 to the extreme left and wait for 20 min, or moisten electrodes with conductive fluid from GAMMA-1 set, then resume stimulation

<TONUS> IMPULSE GENERATOR

9. knobs 4 and 5 → leftmost position
⏻ PWR

cable 2 ←|→ connector OUTPUT
connector INPUT4 of cable 4 →|← connector OUTPUT4 of cable 3
cable 3 →|← connector OUTPUT

10. connector ГОЛЕНЬ ЛЕВАЯ (left shin) of cable 4 →|← connector of electrodes БЕДРО ЛЕВОЕ (left thigh)
connector ГОЛЕНЬ ПРАВАЯ (right shin) of cable 4 →|← connector of electrodes БЕДРО ПРАВОЕ (right thigh)

<TONUS> IMPULSE GENERATOR	11.	sw PROGRAM → III PWR
	12.	Gradually turn knobs 2, 3, 5, 6 to the right until pronounced muscle contractions will occur Stimulate muscles for 10-15 min
	13.	knobs 2, 3, 5, 6 → leftmost position PWR cbl 3 + 4 ←|→electrodes and <TONUS> IMPULSE GENERATOR Stow cables and electrodes in bag
ППС-24	14.	TONUS MED SYS

2.2.2. MYOELECTROSTIMULAITON COMBINED WITH PHYSICAL EXERCISES

(to be performed on the active rest day)

ППС-24	1.	TONUS MED SYS
	2.	Secure Subject next to Tonus equipment
	3.	Apply back-abdomen, thigh, shin electrodes (see diagram on the equipment)
	4.	cbl 3+4 →|← cnctr OUTPUT on <TONUS> IMPULSE GENERATOR cnctr of cbl 4 →|← cnctr of electrodes per decal
<TONUS> IMPULSE GENERATOR	5.	Move knobs 1- 6 (all) to leftmost position sw OPERATIONAL MODE → ⎍⎍⎍ (rapid contractions) sw PROGRAM → III
	6.	PWR Gradually turn knobs 1, 2, 3, 4, 5, 6 to the right until pronounced muscle contractions will occur Stimulate muscles for 2 min
	7.	sw OPERATIONAL MODE → ⎍⎺⎺⎍ (slow contractions) Stimulate for 2 min
	8.	sw OPERATIONAL MODE → ⎍⎍⎍⎍ (rapid contractions) Stimulate for 2 min

<TONUS> IMPULSE GENERATOR	9.	knobs 1- 6 (all) → leftmost position
	10.	connectors ГОЛЕНЬ ЛЕВАЯ (left shin) and ГОЛЕНЬ ПРАВАЯ (right shin) of cable 4 ←⊣→ connectors of shin electrodes connector ГОЛЕНЬ ЛЕВАЯ (left shin) and ГОЛЕНЬ ПРАВАЯ (right shin) of cable 4 →⊣← connectors of electrodes БЕДРО ЛЕВОЕ (left thigh) and БЕДРО ПРАВОЕ (right thigh), respectively
<TONUS> IMPULSE GENERATOR	11.	Gradually turn knobs 2, 3, 5, 6 to the right until pronounced muscle contractions will occur Stimulate for 4 min
	12.	knobs 2, 3, 5, 6 → leftmost position ⏻ PWR cbl 3+4 ←⊣→ electrtodes and <TONUS> IMPULSE GENERATOR Stow all cables and electrodes in bag
ППС-24	13.	⏻ TONUS MED SYS

2.3. TRAINING USING CHIBIS

Hardware:

Gamma-1 equipment
РПГ КОММУТАТОР (Switching unit)
LBNP Chibis
УСИ ВАП-ККГ sensors
УСИ РЭГ-1 sensors
УСИ АД sensors
ГАММА-1 set
Wet wipes
Dry wipes

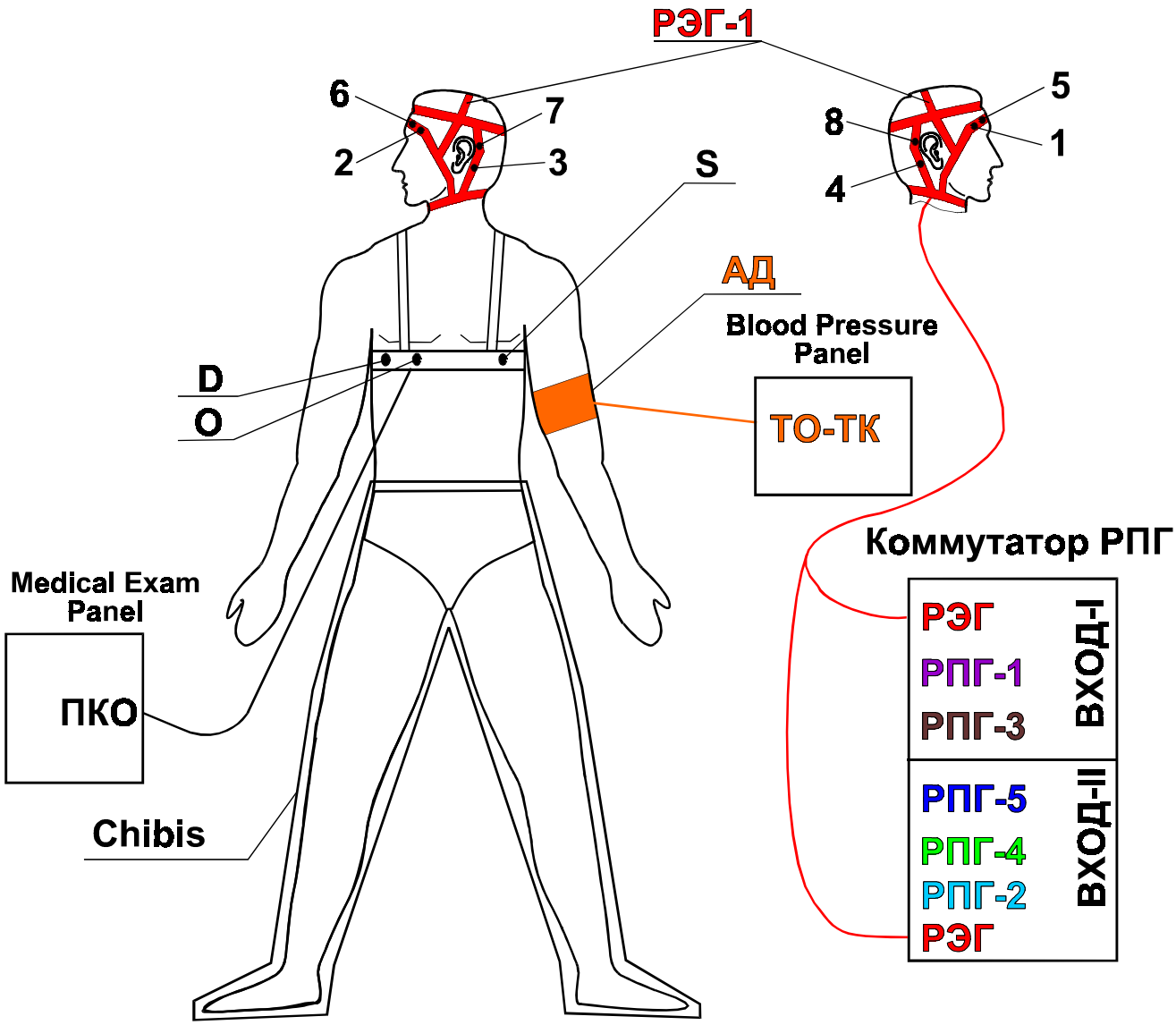


Figure 2.4 Subject Outfitting Diagram

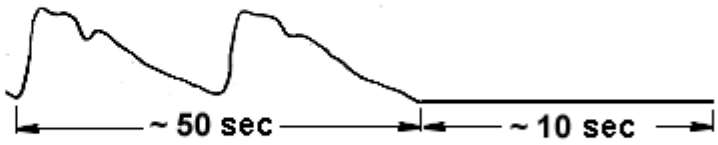
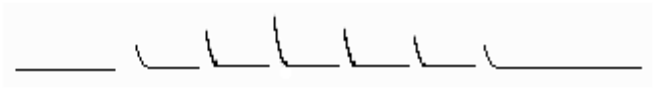
Channel #	Signal description	Waveform on oscilloscope
II	ЭКГ - DS	
III	РПГ (dR/dt)	
IV	РЭГ (ΔR and Ro)	
V	АД-ТО	
VI	ОД	

Figure 2.5 Reference Physiological Curves

1. Unstow required hardware

2. connector OUTPUT of cable 5A4.856.922 →|← connector OUTPUT on РПГ КОММУТАТОР side panel
   connectors INPUT I, INPUT II of cable 5A4.856.922 →|← connectors INPUT I, INPUT II on RHEOPLETHYSMOGRAPHY PANEL (GAMMA-1)

3. Temp stow РПГ КОММУТАТОР

2.3.1. SETUP FOR OPERATION

(00:20:00)

NOTE

Assistant helps Subject with outfitting

1. Unstow ПКО ЭКГ-ККГ biomed harness belt from УСИ ВАП-ККГ bag

2. Moisten electrode pads of ЭКГ-ККГ belt using conductive fluid from ГАММА-1 set

3. Don ЭКГ-ККГ belt at 5th intercostal level (see Figure 2.4 p. 2-13)
   Adjust belt and straps to desired length, engaging hooks into required loops, maintaining symmetry relative to backbone

4. Turn belt down to expose electrode application sites
   Treat skin in electrode application areas using wet wipe
   Apply electrodes to the body
   √ correct placement (see Figure 2.4 p. 2-13) and good contact of ЭКГ-DS with Subject's skin
   ◅ ECG electrodes conform to corresponding "D", "S", "O" labels on biomed harness belt

5. Remove cover from Chibis suit
   Remove shackle strap from Chibis suit
   Unstow hose harness from kit
   √ hose harness →|← cnctrs on Chibis suit, <CHIBIS> SUIT PRESSURE CONTROL

6. Get into Chibis suit
   Pull Chibis suit drum up to the waistline
   Don Chibis suit shoulder straps

Assist Subject with outfitting

7. connector ПКО ЭКГ-ККГ →|← connector EKG HARNESS on MEDICAL EXAM PANEL

8. Unstow ШКО РЭГ-1 biomed cap (of a required size) from УСИ РЭГ-1 bag

9. √ numbers on electrodes match labels on ШКО РЭГ-1
Moisten ШКО РЭГ-1 electrode pads using conductive fluid from GAMMA-1 set

CAUTION

Do not allow hair get under the electrodes

10. Don ШКО РЭГ-1 biomed cap on the head (label 'ЛОБ' should be on the forehead)
Turn down biomed cap straps
Clean skin in РЭГ electrode application sites using wet wipe
Brush hair aside and apply electrodes to the skin

11. √ correct placement of electrodes (see Figure 2.4 p. 2-13):
3, 4 and 7, 8 – on mastoid processes (behind ears) of temporal bones on the left and right sides
1, 5 and 2, 6 – on the right and left sides of the forehead

12. connector INPUT I РЭГ on ШКО РЭГ-1 →|← connector РЭГ (INPUT I) of РПГ КОММУТАТОР (on the left)

connector INPUT II РЭГ on ШКО РЭГ-1 →|← connector РЭГ (INPUT II) of РПГ КОММУТАТОР (on the right)

13. Unstow blood pressure cuff from УСИ АД bag

14. Secure blood pressure cuff on the left arm, the sensor must be 2 cm above elbow crease from inside of arm

15. cuff hose →|← connector CUFF on BLOOD PRESSURE PANEL
cuff cable →|← connector PRESSURE-SOUND on BLOOD PRESSURE PANEL

16. On BLOOD PRESSURE PANEL:
sw OPERATIONAL MODE → PRESSURE WAVE FORM
sw MODE → AUTO
sw mm Hg → 180

17. ⏻ <GAMMA> MED SYS on ППС-24
⏻ CHIBIS MED SYS on ППС-24

18. PANEL PWR on MEDICAL EXAM PANEL
    - PANEL PWR on MEDICAL EXAM PANEL
    - upper LED on BLOOD PRESSURE PANEL
    - LED on RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1>

19. sw OPERATIONAL MODES on MEDICAL EXAM PANEL → OSC

20. On OSCILLOSCOPE:
    sw OPERATIONAL MODES → SWEEP
    pb BRIGHTNESS → the middle position
    pb SWEEP VELOCITY→ the middle position

21. On РПГ КОММУТАТОР:
    left sw PROGRAM → 2
    right sw PROGRAM → OFF

22. Set signal amplitude:
    sw GAIN II on MEDICAL EXAM PANEL → 5
    GAIN on BLOOD PRESSURE PANEL → 3
    sw GAIN I on RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1>
    $R_O \rightarrow 3$
    $\Delta R \rightarrow 4$

23. presence and proper waveform of signals (see Figure 2.5 p. 2-14), sequentially toggle on MEDICAL EXAM PANEL:
    sw OSCILLOSCOPE → II (ЭКГ-DS)
    sw OSCILLOSCOPE → III (dR/dt)
    sw OSCILLOSCOPE → IV (РЭГ (ΔR and R_O sequentially))

24. START on BLOOD PRESSURE PANEL

25. presence and proper waveform of signals (see Figure 2.5 p. 2-14), sequentially toggle on MEDICAL EXAM PANEL:
    sw OSCILLOSCOPE → V (АД-ТО)
    sw OSCILLOSCOPE → VI (ОД)

26. Tighten Chibis waist belt (belt pad of removable waste seal curtain should be in the small of the back)

NOTE

Gain settings for all recorded physiological curves may be changed on **MCC GO**

2.3.2. MCC CONTROLLED OPERATION
(Telemetry Session)

NOTE

Chibis training sequence is shown in Table 2.1 p.2-20

1.	T.0 **On MCC GO**	
2.	Relax during blood pressure measurement	
3.	Move lower part of the legs to simulate walking during the remainder of the session	
4.		On MEDICAL EXAM PANEL: sw OPERATIONAL MODES → TLM GAIN After 10 sec, sw OPERATIONAL MODES → OSC
5.		↓ START on BLOOD PRESSURE PANEL
6.		sw on <CHIBIS> SUIT PRESSURE CONTROL → AUTO VACUUM □ LED on <CHIBIS> SUIT PRESSURE CONTROL

WARNING

To quickly return to ambient pressure in an emergency, loosen Chibis suit waist belt and break seal around body

7.		√ **MCC** to adjust VACUUM (negative pressure) knob position.
8.	T.KTM (end of session)	
9.		sw on <CHIBIS> SUIT PRESSURE CONTROL → OFF ■ LED on <CHIBIS> SUIT PRESSURE CONTROL

2.3.3. CLOSEOUT OPERATIONS

(00:15:00)

1.		⏚ PANEL PWR on MEDICAL EXAM PANEL ■ LED PANEL PWR on MEDICAL EXAM PANEL ■ upper LED on BLOOD PRESSURE PANEL ■ LED on RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1>
2.		cnctr ПКО ЭКГ-ККГ, ШКО РЭГ-1, blood pressure cuff ↤┼↦ cnctrs of ГАММА-1М
3.		⏚ <GAMMA> MED SYS on ППС-24 ⏚ CHIBIS MED SYS on ППС-24
4.	Doff Chibis suit	
5.	Doff ПКО ЭКГ-ККГ, ШКО РЭГ-1, blood pressure cuff hose harness ↤┼↦ Chibis suit Dry out ПКО ЭКГ-ККГ, ШКО РЭГ-1	
6.	Wipe inside surface of Chibis suit waist seal curtain using wipe Dry out Chibis suit for 30-60 min using air blowing from airduct outlets	
7.	Fold Chibis suit Reinstall shackle strap Stow air hoses Install cover on Chibis suit Stow Chibis suit Stow ПКО ЭКГ-ККГ, ШКО РЭГ-1, and blood pressure cuff	

Table 2.1 Chibis Suit Training Diagram

BLOOD PRESSURE PANEL:
sw MODE → AUTO
OPERATIONAL MODES → PRESSURE WAVE FORM
Mm Hg → 180
on MCC GO: ↓ START on BLOOD PRESSURE PANEL

RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1> and РПГ КОММУТАТОР:
ШКО РЭГ-1 →|← РПГ КОММУТАТОР
right sw PROGRAM of РПГ КОММУТАТОР → OFF
left sw PROGRAM of РПГ КОММУТАТОР → 2

	Impact modes	Impact time
Preliminary training sessions		
day 1	10, 15, 20, 25 mm Hg	5 min
day 2	15, 20, 25, 30 mm Hg	5 min
day 3	20, 25, 30, 35 mm Hg	5 min
day 4	25, 30, 35, 40 mm Hg	5 min
day 5	25, 35, 40, 45 mm Hg	5 min
day 6	25, 35, 40, 45 mm Hg	5 min
	When each training session is complete gradual decrease (for 1 min) up to 0	
Final training sessions (two days)		
1 cycle	25, 35, 40, 45 mm Hg Gradual decrease (for 1 min) up to 0	5 min
2 cycle	25, 35, 45 mm Hg 30 mm Hg Gradual decrease (for 1 min) up to 0	10 min 5 min

2.4. RANDOM MUSCULAR EXERTION (ПМН)

Perform ПМН per indication of Flight Surgeon over the first 1-5 days in the period of acute adaptation to microgravity and when experiencing vestibular autonomic discomfort

At the first signs of discomfort:
- Avoid jerky movements of head and eyes
- Sit in seatliner or Cycle Ergometer seat
- Press spine and back of your head firmly against the support, with arms on the arm rests
- Close eyes or focus them on a non-moving object
- Take 3-5 deep, well-controlled breaths slowly exhaling each time

If there is no improvement, perform ПМН:
- Flex leg muscles, increasing exertion level to a max over 3-4 sec and hold for 5-10 sec
- Relaxing leg muscles, flex arm and chest muscles following the same pattern
- Relaxing arms, contract extensors of the trunk and neck, followed by the flexion of abdomen muscles
- Breath in any convenient manner, as exertion increases - inhale deeper

Repeat exercises continuously 3-4 times (breathe without using diaphragm when flexing the abdomen muscles)

2.5. TVIS TREADMILL EXERCISE

Hardware:

TVIS
TVIS exercise suit
Accessory kits

2.5.1. EXERCISE PREPARATION

HRM kit

1. Unstow (HRM) chest strap and HRM transmitter
   Don (HRM) chest strap
   Install HRM transmitter

2. Don training underwear, footwear

3. √ TVIS Cntl Pnl secured near TVIS and ready for operation

Exercise kit

4. Unstow individual CCM card
   Secure (CCM card) near TVIS Cntl Pnl

> NOTE
>
> Text messages (underlined font) specified below shall be monitored on MAIN MENU/MESSAGE LCD screen, if other LCD is not specified

pnl 435,
БВП - 20
БВП - 20
TVIS Cntl Pnl

5. SYSTEM ACTIVATION
   - ON (left)
   - ON (right)
   - LED SYS PWR

6. ↓ SYS PWR LED
   - all LCDs
   - INSERT CCM

TVIS Cntl Pnl (top)

- LED MOTOR TRD **********
- LED PWR TRD **********
- LED GYRO VIS **********
- LED STBL VIS **********

****

Lift switch protective cover
↓ respective pb above LED
If ■ LED - per **MCC** instructions

****

> NOTE
>
> To return to previous menu or to clear erroneous command input, ↓ CLR

7. ↓ ENT
   ☐ UNIT SELECTION
   ■ UNKNOWN SUBJECT
   ↓ 1(2) to select English or Metric units (miles, pounds (kilometers, kilograms))
   ↓ ENT
   ☐ VIS STATUS MENU

TVIS Cntl Pnl (top)

8. ↓ GIRO VIS ☐ LED
   ↓ STBL VIS ☐ LED

> NOTE
>
> 1. VIS STATUS MENU will be indicating gyro underspeed status, at the same time its speed will be increasing
> 2. All stabilizers (four) will be reporting errors until gyro speed reaches 2000 rpm
> 3. Gyro spin-up time - 5---10 minutes

Exercise kit

9. DONNING TVIS EXERCISE SUIT
   Unstow TVIS suit
   Unfasten two waist strap buckles (blue)
   Unfasten Velcro strap
   Insert arms into harness straps
   Fasten chest strap buckle (orange), adjust strap length if necessary
   Fasten Velcro strap
   Fasten two waist strap buckles (blue)
   Tighten two front straps (blue) of waist belt
   Tighten two back straps (yellow) of waist belt
   Tighten two front shoulder straps (green)
   Tighten two back shoulder straps (purple)

TVIS Cntl Pnl

10. ◅ GYRO SPEED 2300 ± 150
    ↓ SYSTEM PAUSE
    ☐ SYSTEM PAUSED

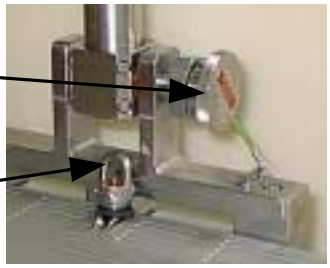
11. ↓ 7 (to stop system work cycle)
    ◅ digit 7 appears in the screen upper row
    ↓ ENT
    ☐ FOR FINAL SUBJECT LOAD
    ↓ ENT
    ☐ EXERCISE COMPLETE
    ☐ INSERT CCM
    ■ BELT SPEED
    ■ HEART RATE
    ■ DISTANCE
    ■ ELAPSED TIME
    ■ EXERCISE PROFILE
    System is ready for the first subject

2.5.1.1. SUBJECT'S POSITION ON TVIS

1. Unstow bungees from exercise kit
   Bungees →|← to right and left D-rings on TVIS suit waist strap, located closest to centerline of thigh

TVIS

2. Side brackets → Vertical position
   Tighten knurled knobs (two)



3. Stand on TVIS side running boards, placing feet between Series Bungee System
   Bungees →|← to Series Bungee System D-rings
   (if necessary, adjust length using clevises)

4. Side brackets clevises →|← to same D-rings on waist strap of TVIS suit as with bungees

TVIS Cntl Pnl

5. Lift left top cover of TVIS Cntl Pnl
   Insert CCM card in the slot, placing the marked side of card to Cntl Pnl rear panel.
   ☐ UNIT SELECTION
   ◪ *Card owner info*

6. ↓ 1(2) to select English or Metric units (miles, pounds (kilometers, kilograms))
   ↓ ENT
   ☐ PROTOCOL SELECTION MENU

7. Select operation mode (see Sect 2.5.2.1 page 2-31 or Sect 2.5.3 page 2-34) - per **MCC** instructions

2.5.2. THREE-DAY CYCLE TRAINING USING TVIS

1. Per **MCC** instructions perform exercises according to physical training procedures (see Table 2.3 page 2-28, Table 2.4 page 2-29, Table 2.5 page 2-30)
   Exercises are described in Table 2.2
2. Upon exercise completion
   ↓ SYSTEM PAUSE □ SYSTEM PAUSED
3. Perform closeout operations Sect 2.5.4 page 2-35

NOTE

To stop TVIS belt tighten belt resistance switch until stop

PHYSICAL EXERCISES ON TVIS

Table 2.2

Exercise No.	Exercise description	TVIS mode
1.	Exercise preparation	
2.	Walking: ordinary steps, on toes, on heels, on outer and inner sides of foot (Speed = 4.5 --- 5 km/h, T= 2 min)	Magnet → EMERGENCY STOP No-load
3.	Medium pace running (Speed = 6.5---7 km/h, T= 2 мин)	Magnet → EMERGENCY STOP No-load
4.	Breathing exercises with movements of arms 4 --- 5 times	Magnet ← EMERGENCY STOP Belt stop
5.	Semi-squats with "load" Initial position — main stance, middle of long bungee behind shoulders, toes inside loops, 15---20 times	Magnet ← EMERGENCY STOP Belt stop
6.	Press with one arm up, aside, short bungee, 12 --- 15 times, quick pace Same with the other arm	Magnet ← EMERGENCY STOP Belt stop
7.	Pelvis round movements Initial position — main stance, arms on waist 4 --- 5 times to right and left	Magnet ← EMERGENCY STOP Belt stop
8.	Walking (Speed = 4.5---5 km/h, T= 2 min)	Magnet → EMERGENCY STOP No-load
9.	Medium pace running (Speed = 6.5---7 km/hr, T= 2 min)	Magnet → EMERGENCY STOP No-load

Table 2.2 (continued)

10.	Press from chest. Initial position — main stance, bungee behind back, First day: 12 --- 15 times, quick pace (1 time per 1 sec) Second day: 2 sessions 15 times each, pace – 3 times per 2 sec Pause - 10 sec	Magnet ← EMERGENCY STOP Belt stop
11.	Squats with "load" Initial position — main stance, middle of long bungee behind shoulders, toes inside loops 12 --- 15 times, quick pace	Magnet ← EMERGENCY STOP Belt stop
12.	Trunk bending and unbending with "load" Initial position — main stance, middle of long bungee behind shoulders, toes inside loops At the end of unbending — rise on toes Until slightly tired	Magnet ← EMERGENCY STOP Belt stop
13.	Day 2: Walking (Speed = 4.5 --- 5 km/h, T= 1 min) Running, medium pace (Speed = 6.5 --- 7 km/h, T= 2 min) Day 3, 1 cycle: Walking (Speed = 5 km/h, T= 1 min) Running (Speed = 8 km/h, T= 1 min)	Magnet → EMERGENCY STOP Movement mode
14.	"Hammer through" imitation Initial position — press loop of middle bungee to TVIS belt with right foot, hold second loop of the bungee with both hands Day 1: 10 times, T= 20 sec (1 time per 2 seconds) Day 2: 12 times, pace: 1 time per 3 sec Day 3: 2 sessions 10 times each, pace: 1 time per 2 sec, pause - 15 sec	Magnet ← EMERGENCY STOP Belt stop
15.	Day 1: Same as exercise 14 - in opposite direction Day 3: Same as exercise 14 - in opposite direction	Same as exercise 14
16.	Breathing exercises with relaxation, 3 --- 4 times	Belt stop
17.	First day 4 cycles successively, holding by hands Walking (Speed = 5 km/h, T= 2 min) Running (Speed = 14 km/h, T= 1 min) Relaxed walking 30 sec Second day 3 cycles: cycles 1 and 3 – no load Walking (Speed =5 km/h, T= 2 min) Running (Speed =8 km/h, T= 3 min) cycle 2 – movement mode Walking (Speed = 5 km/h, T= 2 min) Running (Speed = 13 km/h, T= 3 min) Relaxed walking 30 sec Third day 3 cycles: cycles 1 and 2: Walking (Speed = 5 km/h, T= 2 min) Running (Speed = 13 km/h, T= 4 min) cycle 3: walking (Speed = 5 km/h, T= 2 min) Running (Speed = 8 km/h, T= 4 min) Relaxed walking 30 sec	Magnet → EMERGENCY STOP Movement mode Magnet → EMERGENCY STOP Combined mode Magnet → EMERGENCY STOP Movement mode

Table 2.2 (continued)

18.	Breathing exercises with relaxation, 3 --- 4 times	Magnet ← EMERGENCY STOP Belt stop
19.	Hops with “load” Initial position — main stance, middle of long bungee behind shoulders, toes inside loops 2 sessions 20 times each, pause 10 --- 15 sec	Magnet ← EMERGENCY STOP Belt stop
21.	Trunk bending and unbending with "load" Initial position — main stance, middle of long bungee behind shoulders, toes inside loops At the end of unbending — rise on toes Until slightly tired	Magnet ← EMERGENCY STOP Belt stop
22.	First day cycle 1: Walking (Speed = 5 /h, T= 2 min) Running (Speed = 8 km/h, T= 3 min) Second day cycle 1: Walking (Speed = 5 km/h, T= 1 min) Running (Speed = 8km/h, T= 2 min) Third day cycle 1: Walking (Speed = 5 km/h, T= 1 min) Running (Speed = 8 km/h, T= 3 min)	Magnet → EMERGENCY STOP Movement mode
23.	First day: Walking (Speed = 4.5 --- 5 km/h, T= 1 min) Second day: Walking (Speed = 4.5 --- 5 km/h, T=1 min) Deep breathing exercise Third day: Walking (Speed = 4.5 --- 5 km/h, T= 1.5 min)	Magnet → EMERGENCY STOP No-load

Table 2.3

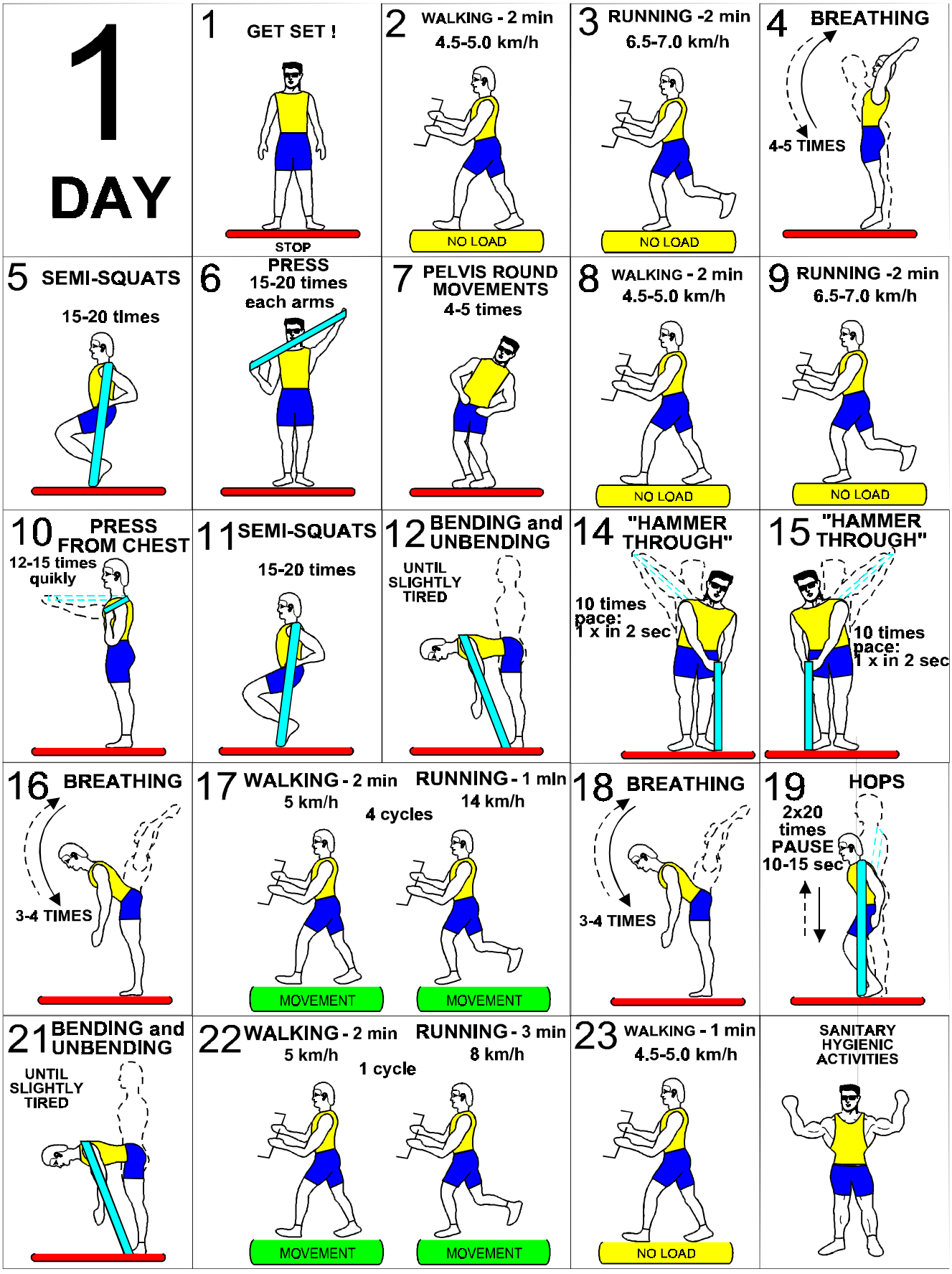

1
DAY
1 GET SET !
STOP
2 WALKING - 2 min
4.5-5.0 km/h
NO LOAD
3 RUNNING -2 min
6.5-7.0 km/h
NO LOAD
4 BREATHING
4-5 TIMES
5 SEMI-SQUATS
15-20 tlmes
6 PRESS
15-20 times
each arms
7 PELVIS ROUND
MOVEMENTS
4-5 times
8 WALKING - 2 min
4.5-5.0 km/h
NO LOAD
9 RUNNING -2 min
6.5-7.0 km/h
NO LOAD
10 PRESS
FROM CHEST
12-15 times
quikly
11 SEMI-SQUATS
15-20 times
12 BENDING and
UNBENDING
UNTIL
SLIGHTLY
TIRED
14 "HAMMER
THROUGH"
10 times
pace:
1 x in 2 sec
15 "HAMMER
THROUGH"
10 times
pace:
1 x in 2 sec
16 BREATHING
3-4 TIMES
17 WALKING - 2 min
5 km/h
RUNNING - 1 mln
14 km/h
4 cycles
MOVEMENT
MOVEMENT
18 BREATHING
3-4 TIMES
19 HOPS
2x20
times
PAUSE
10-15 sec
21 BENDING and
UNBENDING
UNTIL
SLIGHTLY
TIRED
22 WALKING - 2 min
5 km/h
RUNNING - 3 min
8 km/h
1 cycle
MOVEMENT
MOVEMENT
23 WALKING - 1 min
4.5-5.0 km/h
NO LOAD
SANITARY
HYGIENIC
ACTIVITIES

Table 2.4

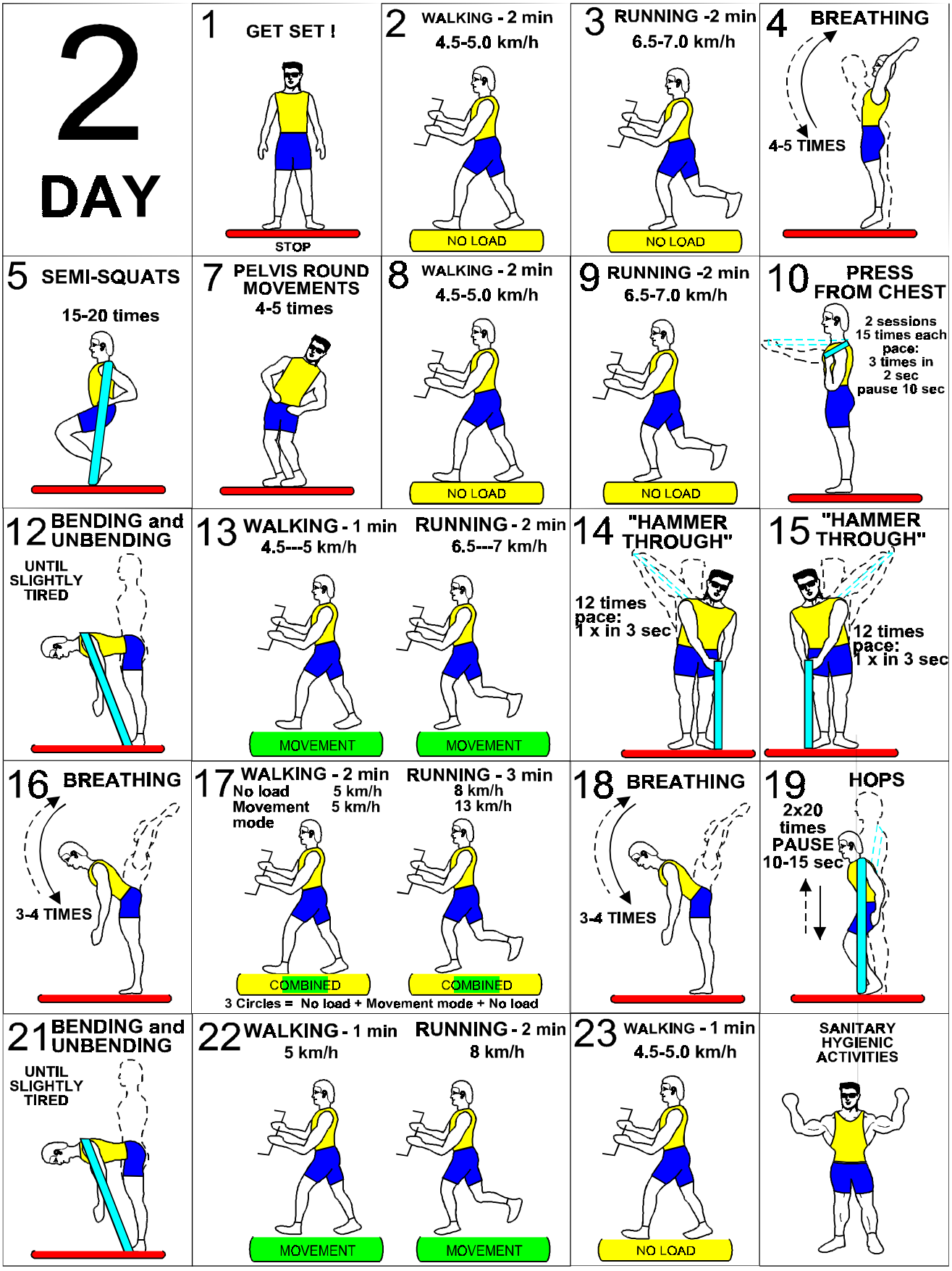
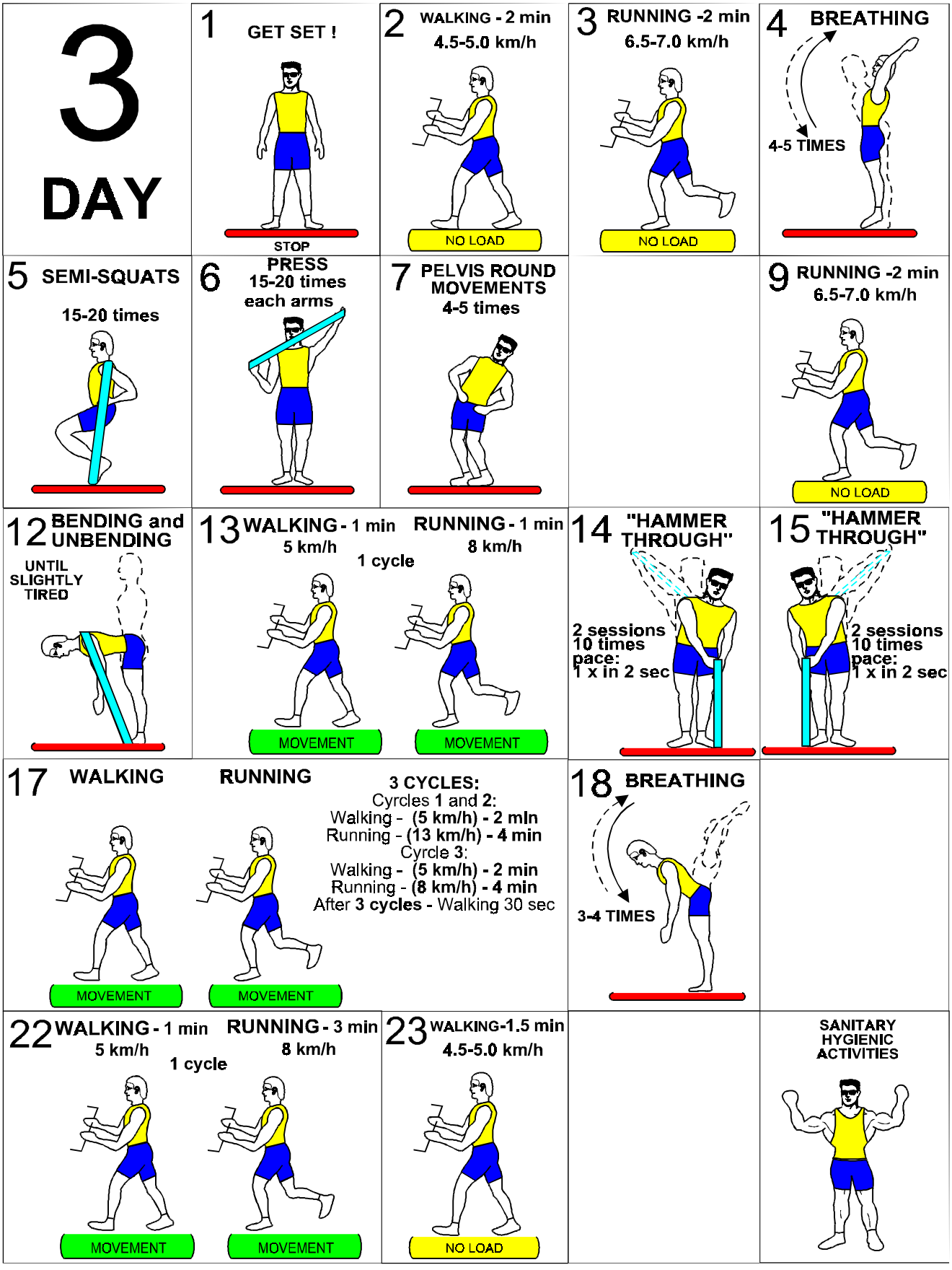

2
DAY
1 GET SET !
STOP
2 WALKING - 2 min
4.5-5.0 km/h
NO LOAD
3 RUNNING -2 min
6.5-7.0 km/h
NO LOAD
4 BREATHING
4-5 TIMES
5 SEMI-SQUATS
15-20 times
7 PELVIS ROUND MOVEMENTS
4-5 times
8 WALKING - 2 min
4.5-5.0 km/h
NO LOAD
9 RUNNING -2 min
6.5-7.0 km/h
NO LOAD
10 PRESS FROM CHEST
2 sessions
15 times each
pace:
3 times in
2 sec
pause 10 sec
12 BENDING and UNBENDING
UNTIL SLIGHTLY TIRED
13 WALKING - 1 min
4.5---5 km/h
RUNNING - 2 min
6.5---7 km/h
MOVEMENT
MOVEMENT
14 "HAMMER THROUGH"
12 times
pace:
1 x in 3 sec
15 "HAMMER THROUGH"
12 times
pace:
1 x in 3 sec
16 BREATHING
3-4 TIMES
17 WALKING - 2 min
No load 5 km/h
Movement 5 km/h
mode
RUNNING - 3 min
8 km/h
13 km/h
COMBINED
COMBINED
3 Circles = No load + Movement mode + No load
18 BREATHING
3-4 TIMES
19 HOPS
2x20
times
PAUSE
10-15 sec
21 BENDING and UNBENDING
UNTIL SLIGHTLY TIRED
22 WALKING - 1 min
5 km/h
RUNNING - 2 min
8 km/h
MOVEMENT
MOVEMENT
23 WALKING - 1 min
4.5-5.0 km/h
NO LOAD
SANITARY HYGIENIC ACTIVITIES

Table 2.5


3
DAY
1 GET SET !
STOP
2 WALKING - 2 min
4.5-5.0 km/h
NO LOAD
3 RUNNING -2 min
6.5-7.0 km/h
NO LOAD
4 BREATHING
4-5 TIMES
5 SEMI-SQUATS
15-20 times
6 PRESS
15-20 times
each arms
7 PELVIS ROUND
MOVEMENTS
4-5 times
9 RUNNING -2 min
6.5-7.0 km/h
NO LOAD
12 BENDING and
UNBENDING
UNTIL
SLIGHTLY
TIRED
13 WALKING - 1 min
5 km/h
RUNNING - 1 min
8 km/h
1 cycle
MOVEMENT
MOVEMENT
14 "HAMMER
THROUGH"
2 sessions
10 times
pace:
1 x in 2 sec
15 "HAMMER
THROUGH"
2 sessions
10 times
pace:
1 x in 2 sec
17 WALKING
RUNNING
3 CYCLES:
Cyrcles 1 and 2:
Walking - (5 km/h) - 2 mln
Running - (13 km/h) - 4 min
Cyrcle 3:
Walking - (5 km/h) - 2 min
Running - (8 km/h) - 4 min
After 3 cycles - Walking 30 sec
MOVEMENT
MOVEMENT
18 BREATHING
3-4 TIMES
22 WALKING - 1 min
5 km/h
RUNNING - 3 min
8 km/h
1 cycle
MOVEMENT
MOVEMENT
23 WALKING-1.5 min
4.5-5.0 km/h
NO LOAD
SANITARY
HYGIENIC
ACTIVITIES

2.5.2.1. MANUAL CONTROL MODE

NOTE

In manual control mode and exersise mode according to protocol TVIS belt speed can be increased or decreased by the increment of 0.1 mile/h (0.16 km/h) by one-time pushing of corresponding pushbuttons with arrows or by input of desired speed from numeric keypad and ↓ ENT

TVIS Cntl Pnl

1. ↓ 1 (Transition to manual control mode)
   ◁ Digit 1 appears below the screen upper row
   ↓ ENT
   □ VIS STATUS MENU

2. Magnet → EMERGENCY STOP ■ LED SYS PWR
   If ■ LED SYS PWR, move magnet until LED color changes from yellow to green

3. SLD SYSTEM LOAD SETUP
   ↓ ENT
   □ SUBJECT LOAD
   Input required load using keypad
   Recommended load = 2/3 of own weight

00:00:00

   ↓ ENT
   ■ PREPARE FOR SLD LOAD
   Stand in the center of belt
   Stand still, knees slightly bent

00:00:05

   ■ SLD LOADING
   After end of loading
   □ Use arrow keys to readjust load if required
   ◁ Top row on screen shows actual load
   ↓ ⇧ (⇩) to increase (decrease) load

4. ↓ ENT
   □ ENTER DESIRED BELT SPEED
   ■ CHECK FOR BELT NOT LOCKED
   √ TVIS belt resistance switch → 0
   If exercise in movement mode
   | Perform Sect 2.5.2.2 page 2-32
   If exercise in no load mode
   | Perform Sect 2.5.2.3 page 2-33

2.5.2.2. ACTIVATION MOVEMENT MODE

NOTE

1. For nominal and off-nominal stop of TVIS belt when in movement mode remove magnet from EMERGENCY STOP position on Cntl Pnl
2. To resume operation wait for □ SYSTEM PAUSED,
   magnet → EMERGENSY STOP, ↓ 1, ↓ ENT
3. Performing exercise can be stopped at any time
   ↓ pb SYSTEM PAUSE

To resume operation in the same mode ↓ 1 from menu SYSTEM PAUSED and ↓ ENT

TVIS Cntl Pnl

1. If □ BELT SPEED CONTROL
   | ↓ 2, ENT

   □ ENTER DESIRED BELT SPEED
   ■ CHECK FOR BELT NOT LOCKED
   √ TVIS belt resistance switch → 0

2. Stand on trestles on both sides of belt
   Input required speed using keypad

00:00:00

   ↓ ENT
   ■ PREPARE FOR BELT ACCELERATION
   ◄ Input speed is in the top row on screen
   If belt does not accelerate to required speed, push it with your foot
   | ↓ ⇧ (⇩) to increase (decrease) speed

3. Carefully stand on TVIS belt and start walking (running)
   ◄ LCD screen shows:
   actual speed
   elapsed time
   distance
   heartrate
   ◄ EXERCISE PROFILE LCD screen – icon showing chosen type of exercise

00:00:05

4. Upon completion of walking (running)
   ↓ ⇩ decrease speed to 2---3,2 km/h (2 miles/h)
   ↓ SYSTEM PAUSE
   □ SYSTEM PAUSED
   ↓ 4, ENT
   □ BELT SPEED CONTROL

2.5.2.3. ACTIVATION NO LOAD MODE

NOTE

In no load mode push with your foot resistance switch above the belt surface to adjust resistance of belt

C A U T I O N !

Do not turn resistance switch of belt beyond 0---4 range

TVIS Cntl Pnl
00:00:00

1. If □ 'ENTER DESIRED BELT SPEED'
   | ↓ 00, ENT

   If □ 'BELT SPEED CONTROL'
   | ↓ 3, ENT

00:00:04

2. □ START PASSIVE SESSION
. □ PASSIVE SESSION
◅ Top row of screen – input speed, equal 0
Start exercise in no load mode
◅ LCD screens show:
actual speed
elapsed time
distance
heartrate

****
****
√ Position of HRM transmitter
Wipe contacts
If problem persists
Unstow HRW clock, install and –
Report to MCC
****

3. Upon completion of walking (running)
↓ SYSTEM PAUSE
□ SYSTEM PAUSED
↓ 4, ENT
□ BELT SPEED CONTROL

2.5.3. EXERCISE WITH PRE-PROGRAMMED PROTOCOL

TVIS Cntl Pnl

1. ↓ 2(3)(4) – **on MCC GO**
   ◅ Input number – in second row of screen
   ↓ ENT
   □ VIS STATUS MENU
   ◅ LCD screens show – zero values of
   speed, time, distance, heart-rate
   ◅ EXERCISE PROFILE — icon
   of chosen type of exercise

2. Magnet → EMERGENCY STOP □ LED SYS PWR
   If □ LED SYS PWR, move magnet until LED color changes from yellow to green

00:00:00

3. ↓ ENT
   □ 'AUTO-LOADING'
   Follow instructions on LCD screen

00:00:05 ■ SLD AUTO – LOAD STARTING

00:00:10 ■ SLD LOADING

Upon end of auto-loading
□ Use Arrow Keys To Readjust Load If Required
◅ Actual load shown in top row of screen
↓ ⇧ (⇩) to increase (decrease) load

4 ↓ ENT
■ CHECK FOR BELT NOT LOCKED
√ TVIS belt resistance switch → 0

5. Stand on trestles on both sides of belt

00:00:00 ↓ ENT

00:00:05 ■ 'PREPARE FOR BELT ACCELERATION'

Belt starts moving at first speed according to protocol

00:00:10 Carefully stand on TVIS belt
Start walking (running)
Upon execution of protocol TVIS belt stops
□ SYSTEM PAUSED
Perform Sect 2.5.4 page 2-35

2.5.4. CLOSEOUT

1. LOAD OFF

TVIS Cntl Pnl
- ↓ 7 (Exit from system)
- ◁ Digit 7 appears in the screen upper row
- ↓ ENT
- □ FINAL SUBJECT LOAD
- Stand in center of belt

2. CCM CARD REMOVING
- ↓ ENT
- □ REMOVE CCM CARD

TVIS Cntl Pnl (top)
- ↓ EJECT
- Remove CCM card from slot
- Close slot cover
- □ EXERCISE COMPLETE
- □ INSERT CCM
- ■ BELT SPEED
- ■ DISTANCE
- ■ HEARTRATE
- ■ ELAPSED TIME
- ■ EXERCISE PROFILE

3. Remove magnet from EMERGENCY STOP position

4. Side brackets clevises (two) ↔ from D-rings on waist strap of TVIS suit

5. Bungees ↔ from Series Bungee System D-rings

   If last subject has finished TVIS exercises
   - Fold side brackets to minimum height
   - Loosen knurled knobs (two)
   - Put brackets on belt

6. Bungees ↔ from D-rings on TVIS suit waist strap
   Bungees (two) → into exercise kit
   CCM card → into exercise kit

7. DOFFING OFF TVIS SUIT
   - Loosen shoulder straps
     - two front (green)
     - two back (purple)
   - Unfasten orange chest strap buckle
   - Loosen waist straps
     - two front (blue)
     - two back (yellow)
   - Unfasten two blue waist strap buckle
   - Unfasten Velcro strap
   - Doff TVIS suit
   - Dry suit
   - Stow TVIS suit into exercise kit

8. Remove HRM transmitter from chest strap
   Wipe
   Remove chest strap
   Dry
   Stow HRM transmitter and chest strap in HRM kit
   Stow HRM kit (FGB zone 22)

9. SYSTEM DEACTIVATION

TVIS Cntl Pnl
- Lift right switch protective cover on Cntl Pnl (top)
- ↓ STBL VIS (hold 1 --- 2 sec) LED
- ↓ GYRO VIS (hold 1 --- 2 sec) LED

- LED MOTOR TRD
- LED PWR TRD
- Close switch protective cover

- ↓ SYS PWR LED
- ■ all LCD windows

pnl 435
БВП - 20 OFF (left)
БВП - 20 OFF (right)

10. Stow exercise kit

11. Take off training underwear, footwear

12. Perform sanitary hygienic activities

2.5.5. OFF-NOMINAL SITUATIONS

LCD Message	Meaning	User's actions
EXERCISE PROFILE LCD □ TM FAULT UNDERVOLTAGE X Y Z VOLTS	Low TVIS power (U ≤24 V)	Decrease belt speed until message disappears Continue exercise with this speed ~10 min Return to initial speed ◁ Does message reappear If message reappears Decrease speed Complete exercise **Report to MCC**
▪ VIS FAULT_S	VIS stabilizer failure Also number of stabilizer that failed is shown	Not required If failure causes unstable belt condition: ↓ SYSTEM PAUSE □ SYSTEM PAUSED ↓ 2, ENT □ VIS STATUS/CONTROL ↓ 1, ENT □ VIS CONTROL ↓ 5, ENT □ …STBL OFF ▪ VIS FAULTS S1S2S3S4 ↓ 4, ENT ■ VIS FAULTS S1S2S3S4 □ STBL ON
▪ G	Gyro failure	↓ SYSTEM PAUSE □ SYSTEM PAUSED Deactivate system according to Sect 2.5.4 steps 1 - 3, 9 page 2-35, 2-36 Activate system according to Sect 2.5.1 steps 5 - 8, 10, 11 page 2-22, 2-23 If at second activation trouble persists, repair or replace change gyro

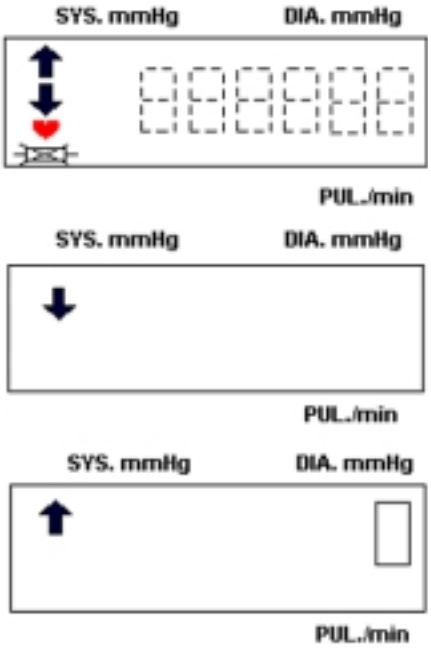
◘ US	Gyro underspeed V < 1800 rpm	↓ SYSTEM PAUSE □ SYSTEM PAUSED ↓ 2, ENT □ VIS STATUS/CONTROL ◅ GYRO SPEED 2000 ↓ SYSTEM PAUSE □ SYSTEM PAUSED ↓ 1, ENT If speed does not increase □ VIS STATUS/CONTROL ↓ 1, ENT □ VIS CONTROL ↓ 3, ENT □ GYRO OFF Wait till full stop ~ 10 min ↓ 2, ENT □ GYRO ON ↓ 7, ENT □ VIS STATUS/CONTROL ◅ GYRO SPEED 2000
	Unstable belt	↓ SYSTEM PAUSE Only per **MCC** instructions VIS control loop gain adjustment 1. VIS controller → in manual control mode: Perform Sect 2.5.4 steps 1, 2 page 2-35 Perform Sect 2.5.1.1 steps 5, 6 page 2-24 Perform Sect 2.5.2.1 step 1 page 2-31 2. Adjust X selector ↓ SYSTEM PAUSE □ SYSTEM PAUSED ↓ 2 , ENT □ VIS STATUS/CONTROL ↓ 1, ENT □ VIS CONTROL ↓ 6, ENT □ PITCH/GAIN CONTROLS ↓ 1, ENT (pitch angle control gain setting) ↓ 2, ENT (Y-axis movement control gain setting)

3. HEALTH MONITORING

3.1. BP MEASUREMENT WITH SPHYGMOMANOMETER TENSOPLUS

3.1.1. SETUP

1. Open case
2. Unstow blood pressure cuff from the case
3. Secure cuff on the arm appr. 2-3 cm above the elbow crease using Velcro clip (cuff arrow being on the arm's inside, with rubber air hose directed downwards)
4. Cuff air connector →|← sphygmomanometer air inlet МАНЖЕТА
5. sw OFF-ON → ON
6. ◅ (over 5 sec) the data displayed on digital readout:



****

****

If display shows ⊣⊠⊢
sw OFF-ON → OFF
Install a fresh set of batteries

****

3.1.2. BLOOD PRESSURE MEASUREMENT

NOTE

Avoid sudden movements of the Subject during BP measurement

1. ↓ START

2. Note blood pressure and pulse rate values from digital readout and enter the results in Table 3.1 p. 3-4 **********

   ****

   If message ' Err 330 ' is displayed, check cuff setup and position, and the cuff-sphygmomanometer correct connection
   Repeat steps 1-2

   ****

3. sw OFF-ON → OFF

4. Cuff air connector ↔ sphygmomanometer

5. Remove cuff

6. Stow cuff and sphygmomanometer in the case

7. Stow the case

For notes

Table 3.1 Arterial Blood Pressure and Pulse Rate Log Sheet

Name	Date	BP	PR

Table 3.1 (cont.)

Name	Date	BP	PR

For notes

3.2. MO-1 INVESTIGATING HEART BIOELECTRICAL ACTIVITY AT REST

Hardware:

GAMMA-1 equipment
УСИ ЭКГ sensors
ГАММА-1 set
ВБ-3 cycle ergometer
Wet wipes

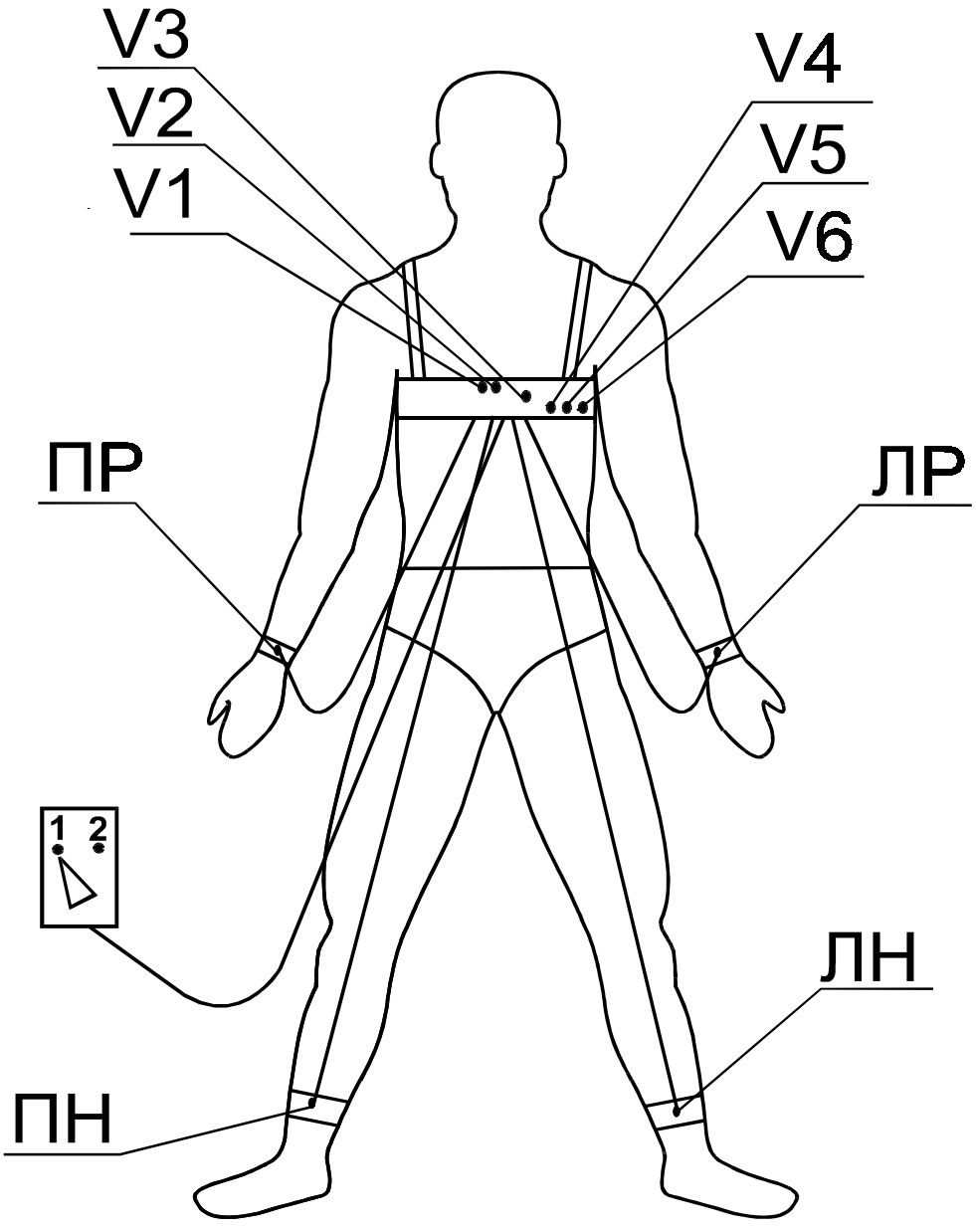


Figure 3.1 Subject's Outfitting for MO-1 Operations

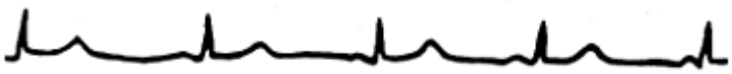
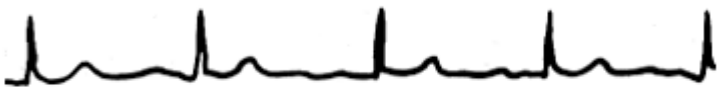
Channel #	Signal description (Sensor location)	Waveform on oscilloscope
I	ЭКГ-2 (Left leg, right hand)	
II	ЭКГ-1 (Right hand, left hand)	
III	ЭКГ-3 (Left leg, left hand)	
IV	ЭКГ-V_1	
V	ЭКГ-V_3	
VI	ЭКГ-V_5	

Figure 3.2 Physiological Curves after ПКО-ЭКГ → 1

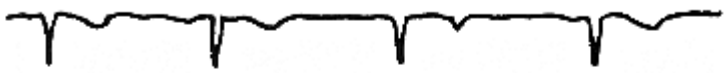
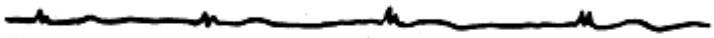
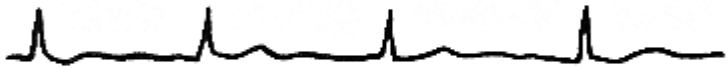
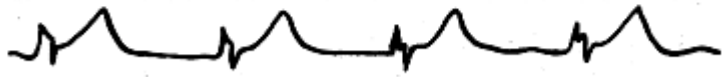
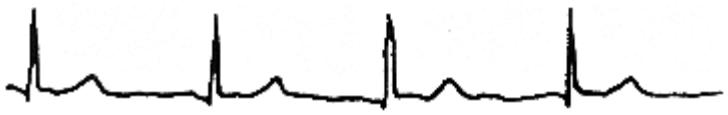
Channel #	Signal description (Sensor location)	Waveform on oscilloscope
I	ЭКГ-aVR (Right hand)	
II	ЭКГ-aVL (Left hand)	
III	ЭКГ-aVF (Left leg)	
IV	ЭКГ-V_2	
V	ЭКГ-V_4	
VI	ЭКГ-V_6	

Figure 3.3 Physiological Curves after ПКО-ЭКГ → 2

1. Install cycle ergometer into working position (see MO Book 1 Sect. 5.4.1 p. 5-15)
   Depress fixer latch and remove pedals
   Stow pedals in seat cover pocket

2. Adjust generator assembly and seat positions:
   Pull fixer latch sleeve on the required rod in the arrow direction
   Adjust generator assembly or seat position as convenient
   Release fixer latch sleeve
   Move generator assembly or seat position until captured (wait for audible click)

3. Setup the required hardware

3.2.1. INITIAL SETUP

(00:15:00)

NOTE

Assistant helps Subject with outfitting

1. Unstow ПКО-ЭКГ biomed harness belt from УСИ ЭКГ bag	Assist Subject with outfitting
2. Moisten belt electrode pads, using conductive fluid from ГАММА-1 set	
3. Don ЭКГ belt at 5th intercostal level Adjust belt and straps to desired length, engaging hook into required loops, maintaining symmetry relative to backbone √ V4,V5,V6 electrodes are located at 5th intercostal level on the left ◅ V4,V5,V6 electrodes match the labeling on ПКО	
4. Turn belt down Treat skin in electrode application areas, using wet wipe √ correct placement and good contact of ECG electrodes with Subject's skin	
5. Mount the cycle ergometer	

6. Unstow the following ECG electrodes from biomed harness pockets:
   ПР (right arm), ЛР (left arm),
   ПН (right leg), ЛН (left leg)
   Moisten electrode pads, using conductive fluid from ГАММА-1 set

7. Treat skin in electrode application areas (inner surfaces of lower thirds of shins and forearms), using wet wipe

8. Attach electrodes to Subject's arms and legs (see Figure 3.1 p. 3-7):
   ПН, ЛН - on the right and left shins (lower third of inner-anterior surface)
   ПР, ЛР - on the right and left forearm (lower third of inner surface)

9. connector ПКО ЭКГ →|← connector EKG HARNESS on MEDICAL EXAM PANEL

10. sw on ПКО-ЭКГ cable → 1

11. ☝ <GAMMA> MED SYS on ППС-24
    ☝ PANEL PWR on MEDICAL EXAM PANEL
    □ LED PANEL PWR

12. sw OPERATIONAL MODES on MEDICAL EXAM PANEL → OSC

13. On OSCILLOSCOPE:
    sw OPERATIONAL MODES → SWEEP
    sw BRIGHTNESS → middle position
    sw SWEEP VELOCITY→ middle position

14. Set signal amplitude on MEDICAL EXAM PANEL:
    sw GAIN I, II, III → 3
    sw GAIN IV, V, VI → 2

NOTE

Gain settings for all recorded physiological curves may be changed on **MCC GO**

15. ◅ presence and proper waveform of signals (see Figure 3.2 p. 3-8), sequentially toggle on MEDICAL EXAM PANEL:
    sw OSCILLOSCOPE → I - VI

16.		sw on cable ПКО-ЭКГ → 2
17.		◅ presence and proper waveform of signals (see Figure 3.3 p. 3-9), sequentlially toggle on MEDICAL EXAM PANEL: sw OSCILLOSCOPE → I - VI
18.		sw on cable ПКО-ЭКГ → 1

3.2.2. MCC CONTROLLED OPERATION
(Telemetry Session)

1.	T.0 At complete rest (physiological parameters will be recorded throughout the whole TM session)	
2.	Inhale deeply and hold breath for 10 sec	
3.		sw OPERATIONAL MODES on MEDICAL EXAM PANEL → TLM GAIN After 10 sec OPERATIONAL MODES → OSC
4.		Sequentially toggle sw GAIN I – VI on MEDICAL EXAM PANEL (**On MCC GO**)
5.		sw on cable ПКО-ЭКГ → 2 sw on cable ПКО-ЭКГ → 1
6.	T.КТМ (end of telemetry session)	

3.2.3. CLOSEOUT OPERATIONS
(00:10:00)

1.		☤ PANEL PWR on MEDICAL EXAM PANEL ■ PANEL PWR
2.		connector ПКО ЭКГ ←|→ connector EKG HARNESS on MEDICAL EXAM PANEL
3.	Dismount cycle ergometer	☤ <GAMMA> MED SYS on ППС-24
4.	Doff biomed harness Dry out biomed harness Stow biomed harness and all accessories	
5.	Stow cycle ergometer (see MO Book 1 Sect. 5.4.3 p.5-18)	

3.3. MO-2 ECG 24-HOUR RECORDING

Purpose:

Recording of dynamic electrocardiograms (ДЭКГ), obtained from two leads over 24 hours

Hardware Components:

'Кардиорегистратор 90205' ECG recorder kit (unit in case, belt, patient cables)

'Кардиорегистратор 90205' accessories kit (electrodes, tape cassettes and batteries)

3.3.1. SETUP FOR OPERATION

1. Unstow kits with ECG recorder and accessories kit
   Secure kits in work area

2. Unstow ECG recorder and power battery from kits

3. Remove ECG recorder from the case
   Open ECG recorder cover
   Install the battery into battery compartment (observing correct polarity)
   Close ECG recorder cover and put it back in the case

NOTE
After ECG recorder cover has been closed, you should hear ECG recorder motor running

4. √□ hrs, min (on digital readout)

   If displayed time differs from SM onboard clock, adjust ECG recorder internal clock in the following way:
   Open ECG recorder cover
   ↓ (using a pointed object) pb **S** (in the right upper corner of the unit)
   ▚ min
   Set minutes, by pressing pb **A**
   ↓ pb **S** ■ min
   ▚ hr
   Set hours, by pressing pb **A**
   ↓ pb **S** □ hr, min (clock resumes time count)

3.3.2. ELECTRODES INSTALLATION AND ECG RECORDING

1. Undress from the waist up

2. Unstow wet and dry wipes from Accessories Kit
   Carefully wipe electrode application areas (see Figure 3.4 p. 3-14), first with a wet wipe, then with a dry one

> NOTE
>
> If necessary, shave off the hair in electrode application areas, using safety razor from the Accessories Kit

3. Unstow electrodes from accessories kit
   Cut open individual packages

4. Apply color-coded electrodes to skin (see Figure 3.4 p. 3-14):
   (1) white right part of thorax under clavicle
   (2) brown left part of thorax under clavicle
   (3) black right part of thorax near 4th rib sternum attachment point
   (4) red between the 5th and 6th rib (left part of thorax on clavicule midline)
   (5) green between the 5th and 6th rib (to the right part of thorax in any place)

5. Unstow electrode cable from Accessories kit
   ECG recorder →|← patient cable →|← electrodes (see Figure 3.4 p. 3-14), making unloading loops, and route the lead wire through the slots in electrode patch
   ◅ colors of electrodes match colors of cable connectors
   Discard packaging

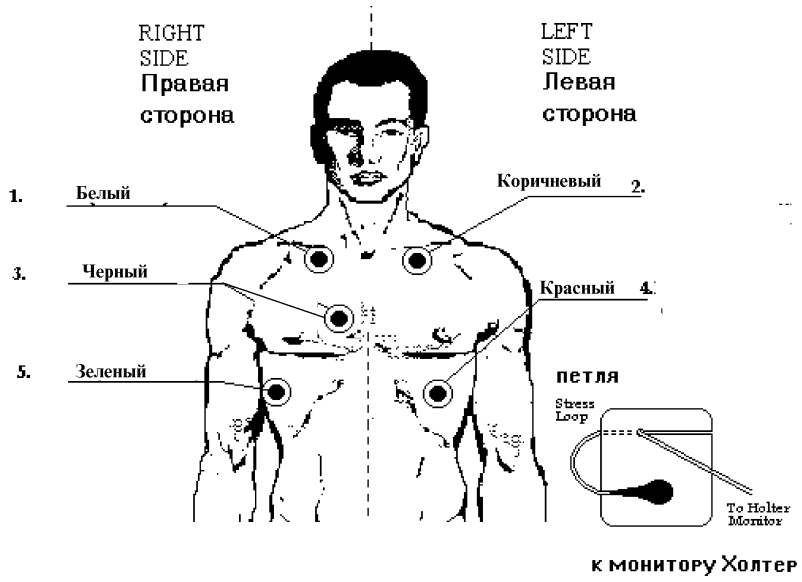


Figure 3.4 Electrode Application Diagram

6. Unstow labeled cassette (**on MCC GO**)
   Remove retainer tab from the cassette, discard retainer tab

7. Record date, time, and subject's name on the cassette label
   Install the cassette into ECG recorder (with the label facing upwards)

8. Close ECG recorder cover
   motor is audible
   tape in cassette is moving

9. Stow ECG recorder in its case
   Secure ECG recorder on the waist using belt

10. Stand by while calibration sequence runs for 12 min

> NOTE
>
> Do not open ECG recorder cover during the whole 24-hour ECG recording session

11. ECG recording will start and should continue for 24 hours

3.3.3. CLOSEOUT OPERATIONS

1. Patient cable ←|→ ECG recorder and electrodes
   Stow cable in ECG recorder kit

2. Detach electrodes from skin
   Wipe electrode application areas with a wet wipe (from accessories kit)
   Discard used electrodes and wipes

3. Remove ECG recorder from its case
   Open cover and take out the cassette and battery
   Discard battery

4. Close ECG recorder cover, put ECG recorder in its case
   Stow case with ECG recorder in ECG recorder kit
   Stow ECG recorder kit

5. Stow the cassette in accessories kit ‘Кардиорегистратор 90205’

3.4. MO-4 ORTHOSTATIC STABILITY EVALUATION WITH LBNP

Hardware:

GAMMA-1 equipment
РПГ КОММУТАТОР
Chibis LBNP system
УСИ ВАП-ККГ sensors
УСИ РПГ-1 sensors
УСИ РЭГ-1 sensors
УСИ АД sensors
УСИ ВПГ sensors
ГАММА-1 set
Wet wipes
Dry wipes

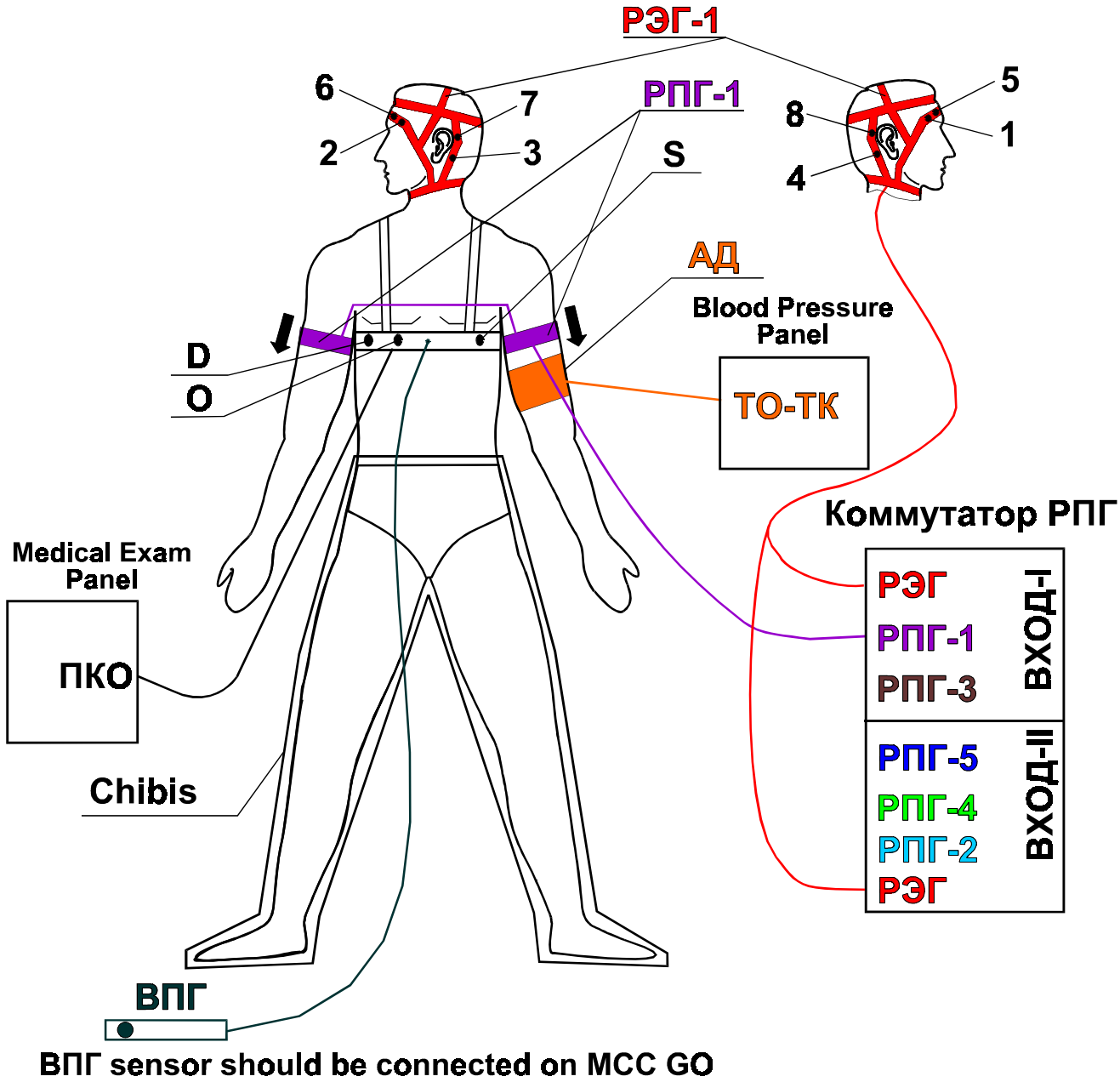


Figure 3.5 Subject's Outfitting for MO-4

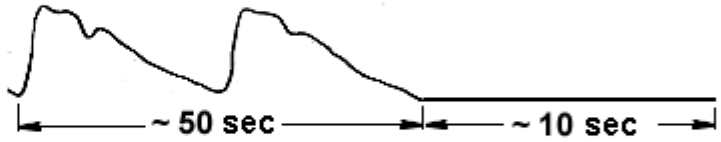
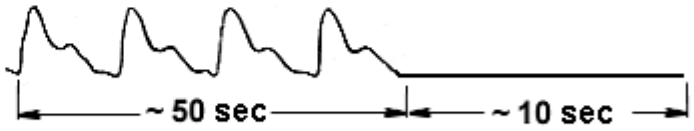
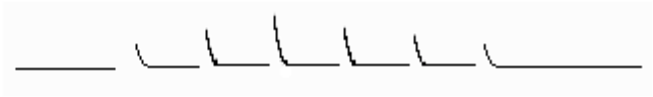
Channel #	Signal description	Waveform on oscilloscope
II	ЭКГ- DS	
III without ВПГ	РЭГ (dR/dt)	
IV without ВПГ	РЭГ (ΔR and Ro)	
IV with ВПГ	РПГ плечо-плечо (ΔR and Ro)	
V	АД-ТО	
VI	ОД	

Figure 3.6 Physiological curves for MO-4

1. Prepare required equipment and hardware

2. connector ВЫХОД of cable 5А4.856.922 →|← connector ВЫХОД (on РПГ КОММУТАТОР side panel)

3. connectors ВХОД I and ВХОД II of cable 5А4.856.922 →|← connectors ВХОД I and ВХОД II (on РПГ КОММУТАТОР panel)

4. Temp stow РПГ КОММУТАТОР

3.4.1. INITIAL SETUP

(00:20:00)

NOTE

Assistant helps Subject with outfitting

1. Unstow ПКО ЭКГ-ККГ biomed harness belt from УСИ ВАП-ККГ bag	Assist Subject with outfitting
2. Moisten ЭКГ-ККГ belt electrode pads using conductive fluid from ГАММА-1 set	
3. Don ЭКГ-ККГ belt at 5th intercostal level (Figure 3.5 p. 3-16) Adjust belt and straps to desired length	
4. Turn belt down Treat skin in ECG electrode application areas using wet wipe Apply electrodes to the body √ Correct placement (see Figure 3.5 p. 3-16) and good contact of ECG-DS electrodes with Subject's skin ◅ ECG electrodes conform to corresponding "D", "S", "O" labels on biomed harness belt	
5. Remove cover from Chibis suit Remove shackle strap from Chibis suit Unstow hose harness from the kit Hose harness →|← connectors of Chibis suit and <CHIBIS> SUIT PRESSURE CONTROL	
6. Get into Chibis suit Pull Chibis suit drum up to waistline Don Chibis suit shoulder straps	

7. connector ПКО ЭКГ-ККГ →|← connector EKG HARNESS on MEDICAL EXAM PANEL

8. Unstow ШКО РЭГ-1 biomed cap (of a required size) from УСИ РЭГ-1 bag

9. √ Numbers on electrodes match lables on ШКО РЭГ-1 biomed cap
Moisten ШКО РЭГ-1 electrode pads using conductive fluid from ГАММА-1 set

CAUTION

Do not allow hair get under the electrodes

10. Don ШКО РЭГ-1 biomed cap on the head (lable "ЛОБ" should be on the forehead)
Place electrodes, making sure to brush hair aside
Turn down biomed cap straps
Treat skin in РЭГ electrodes application areas, using wet wipe pad

11. √ Correct placement of electrodes (see Figure 3.5 p. 3-16):
3, 4 and 7, 8 – on the left and right mastoid processes of temporal bones (behind ears)
1, 5 and 2, 6 – on the left and right sides of the forehead

12. Unstow РПГ-1 ПЛЕЧО-ПЛЕЧО from УСИ РПГ-1 bag

13. Secure РПГ-1 electrodes (ПЛЕЧО ЛЕВОЕ on the left arm and ПЛЕЧО ПРАВОЕ on the right arm) on the borderline between upper and middle thirds of left and right arms respectively (with arrow directed towards palm)

14. connector ВХОД I РПГ-1 (ПЛЕЧО-ПЛЕЧО) →|← connector РПГ-1 (ВХОД I) of РПГ КОММУТАТОР (on the left)

connector ВХОД I РЭГ on ШКО РЭГ-1 →|← connector РЭГ (ВХОД I) of РПГ КОММУТАТОР (on the left)

connector ВХОД II РЭГ on ШКО РЭГ-1 →|← connector РЭГ (ВХОД II) of РПГ КОММУТАТОР (on the right)

15. Unstow blood pressure cuff from УСИ АД bag

16. Secure blood pressure cuff on the left arm, with sensor located approximally 2 cm above the elbow crease on the inside of arm

17. Cuff hose →|← inlet CUFF on BLOOD PRESSURE PANEL
Cuff cable →|← connector PRESSURE-SOUND on BLOOD PRESSURE PANEL

18. On BLOOD PRESSURE PANEL:
sw OPERATIONAL MODE → PRESSURE WAVE FORM
sw MODE → AUTO
sw mm Hg → 180

19. ☝ <GAMMA> MED SYS on ППС-24
☝ CHIBIS MED SYS on ППС-24

20. ☝ PANEL PWR on MEDICAL EXAM PANEL
 LED PANEL PWR on MEDICAL EXAM PANEL
 upper LED on BLOOD PRESSURE PANEL
 LED on RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1>

21. sw OPERATIONAL MODES on MEDICAL EXAM PANEL → OSC

22. On OSCILLOSCOPE:
sw OPERATIONAL MODES → SWEEP
sw BRIGHTNESS → middle position
sw SWEEP VELOCITY → middle position

23. On КОММУТАТОР РПГ:
left sw PROGRAM → 2
right sw PROGRAM → OFF

24. Set signal amplitude:
sw GAIN II on MEDICAL EXAM PANEL → 5
sw GAIN on BLOOD PRESSURE PANEL → 3
Set GAIN I on RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1>:
$R_O \rightarrow 3$
$\Delta R \rightarrow 4$

25. ◅ presence and proper waveform of signals (Figure 3.6, p.3-17), sequentially toggle on MEDICAL EXAM PANEL:
OSCILLOSCOPE → II (ЭКГ-DS)
OSCILLOSCOPE → III (dR/dt)
OSCILLOSCOPE → IV (РЭГ (ΔR and R_O sequentially))

26. Unstow ВПГ sensor from УСИ ВПГ bag

27. Connector of ВПГ sensor →|← ВПГ connector on ПКО biomed harness
(without donning ВПГ sensor, which is used only to complete the circuit)
Temp stow ВПГ sensor in a convenient location

28. On КОММУТАТОР РПГ:
left sw PROGRAM → 1
right sw PROGRAM → OFF

29. Set signal amplitude:
Set GAIN I on RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1>:
$R_O \rightarrow 3$
$\Delta R \rightarrow 2$

30. ◅ presence and proper waveform of signals (Figure 3.6, p. 3-17),
sequentially switching on MEDICAL EXAM PANEL:
OSCILLOSCOPE → II (ЭКГ)
OSCILLOSCOPE → IV (РПГ (ΔR and R_O sequentially))

31. ↓ START on BLOOD PRESSURE PANEL

32. ◅ presence and proper waveform of signals (Figure 3.6, p.3-17),
sequentially toggle on MEDICAL EXAM PANEL:
OSCILLOSCOPE → V (АД-ТО)
OSCILLOSCOPE → VI (ОД)

33. Tighten Chibis waist belt (belt pad of removable waste seal curtain should be in the small of the back)

NOTE

Gain settings for all recorded physiological curves may be changed on **MCC GO**

3.4.2. MCC CONTROLLED OPERATION

(Telemetry Session)

NOTE

For order of steps during telemetry session (controlled by **MCC**), see Table 3.2 p. 3-24

1.	T.0 At complete rest (physiological parameters before test are being recorded)	
2.	Hold breath for 10-15 sec	
3.		On MEDICAL EXAM PANEL: sw OPERATIONAL MODES → TLM GAIN After 10 sec, sw OPERATIONAL MODES → OSC
4.		On КОММУТАТОР РПГ: left sw PROGRAM → 1
5.		connector of ВПГ sensor →|← connector ВПГ on ПКО biomed harness
6.		On КОММУТАТОР РПГ: left sw PROGRAM → 2
7.		cnctr of ВПГ sensor ←|→ cnctr ВПГ on ПКО biomed harness
8.		↡ START on BLOOD PRESSURE PANEL
9.		sw on <CHIBIS> SUIT PRESSURE CONTROL → AUTO VACUUM ☐ LED on <CHIBIS> SUIT PRESSURE CONTROL

WARNING

To return to ambient pressure in an emergency, quickly loosen Chibis suit waist belt and break seal around body

10.	By gradually rotating РАЗРЕЖЕНИЕ knob over 10 sec, set 25 mmHg to last for 1 min
11.	By gradually rotating РАЗРЕЖЕНИЕ knob over 10 sec, set 35 mmHg to last for 2 min
12.	By gradually rotating РАЗРЕЖЕНИЕ knob over 10 sec, set 40 mmHg to last for 3 min

13.		By gradually rotating РАЗРЕЖЕНИЕ knob over 10 sec, set 50 mmHg to last for 3 min
14.		By gradually rotating РАЗРЕЖЕНИЕ knob back over 30 sec, equalize the pressure inside Chibis with the ambient pressure (pressure gauge dial should read 0 mmHg)
15.	At complete rest (physiological parameters after test are being recorded)	
16.	T.КТМ (end of TM session)	
17.		sw on <CHIBIS> SUIT PRESSURE CONTROL → OFF ■ LED <CHIBIS> on SUIT PRESSURE CONTROL

3.4.3. CLOSEOUT OPERATIONS

(00:15:00)

1.		⚲ PANEL PWR on MEDICAL EXAM PANEL ■ LED PANEL PWR on MEDICAL EXAM PANEL ■ upper LED on BLOOD PRESSURE PANEL ■ LED on RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1>
2.		Sensor connectors ↤⊣↦ connectors of <GAMMA-1M> units (all)
3.		⚲ <GAMMA> MED SYS on ППС-24 ⚲ CHIBIS MED SYS on ППС-24
4.	Get out of Chibis suit hose harness ←|→ Chibis suit	
5.	Doff ПКО ЭКГ-ККГ, РПГ-1, ШКО РЭГ-1, ВПГ sensor, blood pressure cuff Dry out ПКО ЭКГ-ККГ, ШКО РЭГ-1	
6.	Wipe inside surface of Chibis suit waist seal curtain using wipe Dry out Chibis suit for 30-60 min using air blowing from airduct outlets	
7.	Fold Chibis suit Reinstall shackle strap Stow air hoses Install cloth cover on Chibis suit Stow Chibis suit Stow ПКО ЭКГ-ККГ, РПГ-1, ШКО РЭГ-1, ВПГ sensor, blood pressure cuff	

Table 3.2 MO-4 Activities Sequence

MO-4 ACTIVITIES SEQUENCE

Blood pressure panel:
MODE → AUTO
OPERATIONAL MODE → PRESSURE WAVE FORM
Mm Hg → 180
↓ START every other minute of test performance

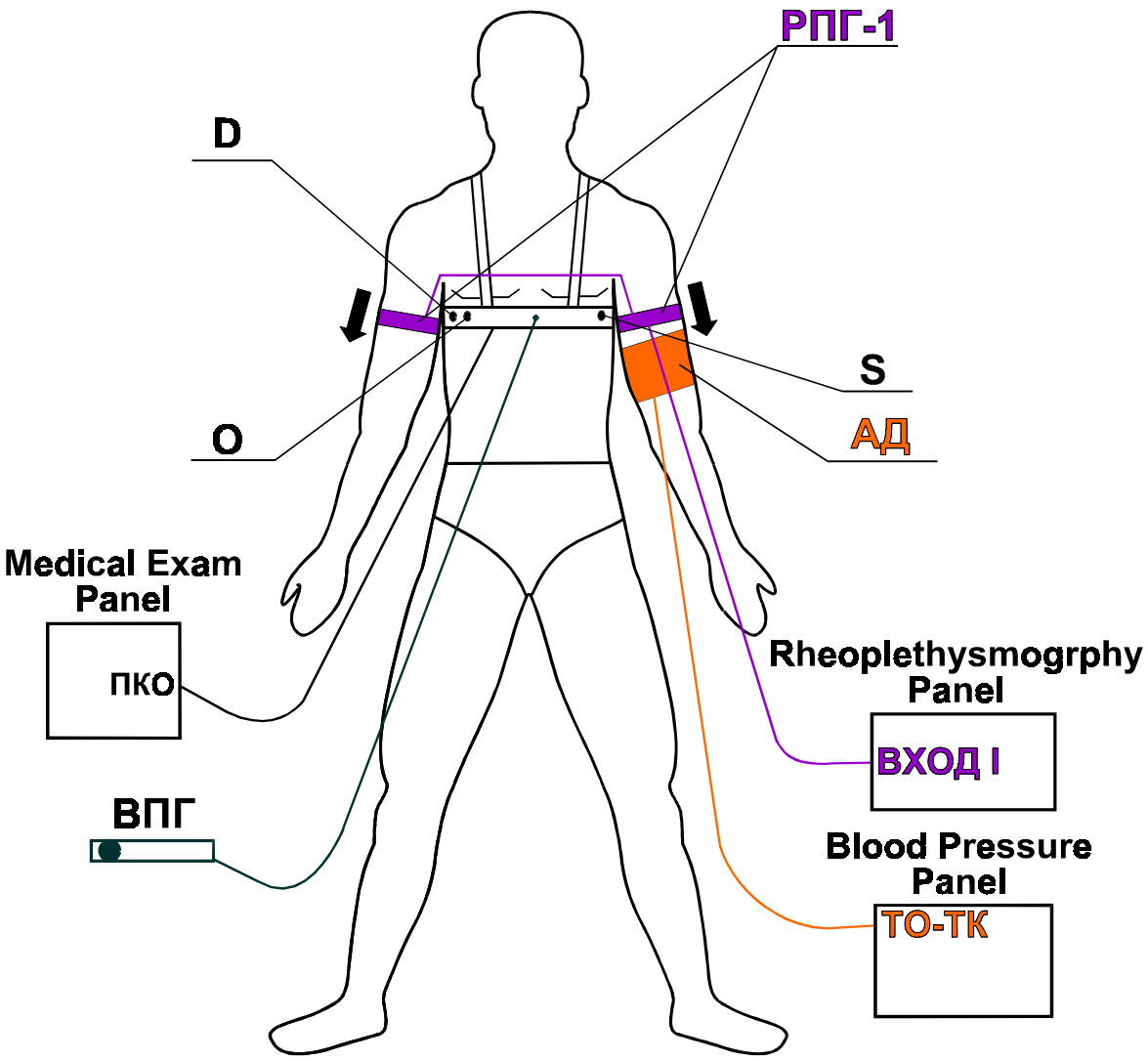
Rheoplethysmography Panel <Gamma-1> [РПГ] and Коммутатор РПГ (РПГ switch):
РПГ-1 and ШКО РЭГ-1 →|← Коммутатор РПГ
The right switch ПРОГРАММА (program) of коммутатора РПГ → ВЫКЛ (Off)

Prior to test					**-25**	**-35 mm Hg**		**-40 mm Hg**			**-50 mm Hg**			**After test**				
1 min	2 min	3 min	4 min	5 min	1 min	1 min	2 min	1 min	2 min	3 min	1 min	2 min	3 min	1 min	2 min	3 min	4 min	5 min
РПГ-1 GAIN I ΔR → 2		**РЭГ** GAIN I ΔR → 4								**РПГ-1** GAIN I ΔR → 2		**РЭГ** GAIN I ΔR → 4						
ВПГ →|←		ВПГ ←|→ cnctr ВПГ ПКО								ВПГ →|←		ВПГ ←|→ cnctr ВПГ ПКО						
Коммутатор РПГ																		
Left switch →1		Left switch → 2								Left switch → 1		Left switch → 2						
ЭКГ - DS continuously recorded during test performance																		

3.5. MO-5 CARDIOVASCULAR EVALUATION DURING GRADED EXERCISES ON CYCLE ERGOMETER

Hardware:

GAMMA-1 equipment
ВБ-3 cycle ergometer
УСИ ВАП-ККГ sensors
УСИ РПГ-1 sensors
УСИ АД sensors
УСИ ВПГ sensors
ГАММА-1 set
Wet wipes



Channel #	Signal description	Waveform on oscilloscope
II	ЭКГ - DS	
IV	РПГ плечо-плечо (ΔR and Ro)	~ 50 sec ~ 10 sec
V	АД - ТК	
VI	ОД	

Figure 3.7 Outfitting Diagram and Reference Physiological Curves for MO-5

1. Install cycle ergometer into working position (see MO Book 1 Sect. 5.4.1 p. 5-15)

2. Adjust generator assembly and seat positions:
   Pull fixer latch sleeve on the required rod in the arrow direction
   Adjust generator assembly or seat position as convenient
   Release fixer latch sleeve
   Move generator assembly or seat position until captured (wait for audible click)

3. Setup the required hardware

3.5.1. INITIAL SETUP

(00:15:00)

NOTE

Assistant helps Subject with outfitting.

1. Unstow ПКО ЭКГ-ККГ biomed harness belt from УСИ ВАП-ККГ bag	Assist Subject with outfitting
2. Moisten ЭКГ-ККГ belt electrode pads using conductive fluid from ГАММА-1 set	
3. Don ЭКГ-ККГ belt at 5th intercostal level (Figure 3.7 p. 3-26) Adjust straps and belt to desired length	
4. Turn belt down Treat skin in ECG electrode application areas using wet wipe Apply electrodes to the body √ correct placement and good contact of ECG-DS electrodes with skin ◅ ECG electrodes conform to corresponding “D", "S", "O" lables on biomed harness belt	
5. Mount the cycle ergometer ↧ **[X]** on cycle ergometer control panel	
6.	Cnctr ПКО ЭКГ-ККГ →|← cnctr EKG HARNESS on MEDICAL EXAM PANEL

7. Unstow РПГ-1 ПЛЕЧО-ПЛЕЧО from УСИ РПГ-1 bag

8. Secure РПГ-1 electrodes (ПЛЕЧО ЛЕВОЕ on the left arm and ПЛЕЧО ПРАВОЕ on the right arm) on the borderline between upper and middle thirds of left and right arms respectively (with arrow directed towards palm) (Fig. 3.7 p. 3-26)

9. connector ВХОД I РПГ-1 (ПЛЕЧО-ПЛЕЧО) →|← connector ВХОД I on RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1>

10. Unstow blood pressure cuff from УСИ АД bag

11. Secure blood pressure cuff on the left arm, with sensor located approximately 2 cm above elbow crease, on inner side of arm

12. cuff hose →|← CUFF inlet on BLOOD PRESSURE PANEL
cuff cable →|← connector PRESSURE-SOUND on BLOOD PRESSURE PANEL

13. On BLOOD PRESSURE PANEL:
sw OPERATIONAL MODE → <KOROTKOV> SOUND
sw MODE → AUTO
sw mm Hg →180

14. Obtain ВПГ sensor from УСИ ВПГ bag

15. connector of ВПГ sensor →|← connector ВПГ on biomed harness (ВПГ sensor is not donned, sensor assembly is used only to complete the circuit)

16. ⏻ <GAMMA> MED SYS on ППС-24

17. ⏻ PANEL PWR on MEDICAL EXAM PANEL
 LED PANEL PWR on MEDICAL EXAM PANEL
 LED (upper) on BLOOD PRESSURE PANEL
 LED on RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1>

18. sw OPERATIONAL MODES on MEDICAL EXAM PANEL → OSC

19. On OSCILLOSCOPE:
sw OPERATIONAL MODES → SWEEP
sw BRIGHTNESS → middle position
sw SWEEP VELOCITY→ middle position

20.	Set signal amplitude: GAIN II on MEDICAL EXAM PANEL → 5 GAIN I on RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1>: R_O → 3 ΔR → 1
21.	◅ presence and proper waveform of signals (Figure 3.7 p.3-26), sequentially switching on MEDICAL EXAM PANEL: sw OSCILLOSCOPE → II (ЭКГ) sw OSCILLOSCOPE → IV (РПГ (ΔR and R_O sequentially))
22.	↓ START on BLOOD PRESSURE PANEL
23.	◅ presence and proper waveform of signals (Figure 3.7 p. 3-26), sequentially toggle on MEDICAL EXAM PANEL: sw OSCILLOSCOPE → V (АД-ТК) sw OSCILLOSCOPE → VI (ОД)

NOTE

Gain settings for all recorded physiological curves may be changed **on MCC GO**

3.5.2. MCC CONTROLLED OPERATION

(Telemetry Session)

NOTE

For sequence of steps during telemetry session, see Table 3.3 p. 3-32

1.	T.0 At complete rest (physiological parameters before test are being recorded)	On MEDICAL EXAM PANEL: sw OPERATIONAL MODES → TLM GAIN Wait for 10 sec, then sw OPERATIONAL MODES → OSC
2.	Start pedaling and after □ LED on display, set load setting 125 W by pressing right pb Δ on cycle ergometer control panel	On BLOOD PRESSURE PANEL: sw mm Hg → 180 sw mm Hg → 240
3.	Work pedals for 3 min at medium speed (60-70 rpm)	↓ START on BLOOD PRESSURE PANEL
4.	Set load setting 150 W by pressing right pb Δ on cycle ergometer control panel	
5.	Work pedals for 3 min at medium speed	
6.	Set load setting 175 W by pressing right pb Δ on cycle ergometer control panel	
7.	Work pedals for 3 min at medium speed	
8.	At complete rest (physiological parameters after test are being recorded)	
9.	T.KTM (end of telemetry session)	

3.5.3. CLOSEOUT OPERATIONS

(00:15:00)

1.		⏚ PANEL PWR on MEDICAL EXAM PANEL ■ PANEL PWR on MEDICAL EXAM PANEL ■ LED (upper) on BLOOD PRESSURE PANEL ■ LED on RHEOPLETHYSMOGRAPHY PANEL <GAMMA-1>
2.		connector on ВПГ sensor ←|→ connector ВПГ on ПКО biomed harness connectors ПКО ЭКГ-ККГ, РПГ-1, blood pressure cuff ←|→ connectors of <GAMMA-1M> units
3.		⏚ <GAMMA> MED SYS on ППС-24
4.	↓ **[X]** on cycle ergometer control panel Dismount cycle ergometer	
5.	Doff ПКО ЭКГ-ККГ, РПГ-1, ВПГ sensor, blood pressure cuff Dry out ПКО ЭКГ-ККГ electrode pads Stow ПКО ЭКГ-ККГ, РПГ-1, ВПГ sensor, blood pressure cuff	
6.	Stow cycle ergometer (see MO Book 1 Sect. 5.4.3 p.5-18)	

Table 3.3 MO-5 Activities Sequence

MO-5 ACTIVITIES SEQUENCE

Blood pressure panel:
MODE → AUTO
OPERATIONAL MODE → KOROTROV SOUND
mm Hg . → per activities sequence

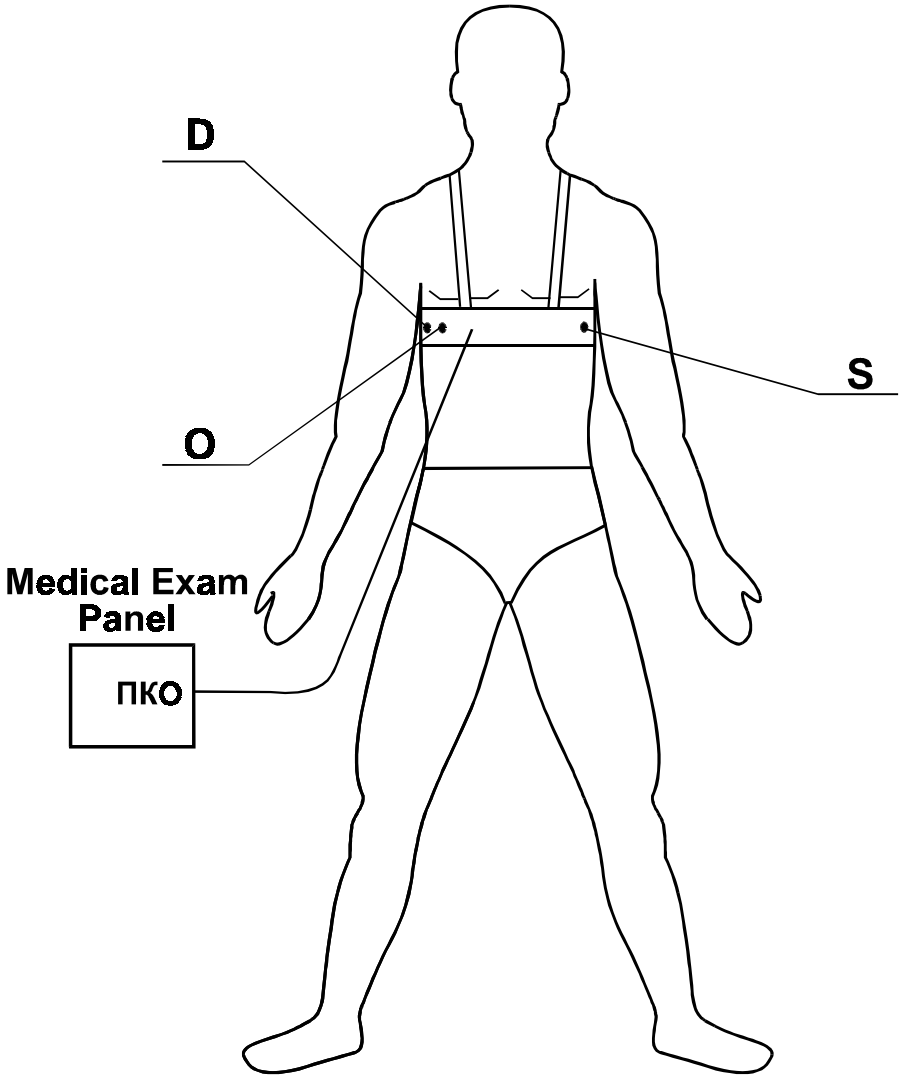
Rheoplethysmography Panel <Gamma-1> [РПГ]:
cnctr КО РПГ-1 →|← cnctr INPUT I on РПГ
cnctr of ВПГ sensor →|← ВПГ cnctr on EKG HARNESS

Prior to test					**125 W**			**150 W**			**175 W**			**After test**				
1 min	2 min	3 min	4 min	5 мин	1 min	2 min	3 min	1 min	2 min	3 min	1 min	2 min	3 min	1 min	2 min	3 min	4 min	5 min
Mm Hg → 180					Mm Hg → 240										Mm Hg → 180			
↑	↑	↑	↑	↑		↑			↑			↑		↑	↑	↑	↑	↑
↑ - ↓ START on blood pressure panel (during load – at the end of the second minute of each step)																		
ЭКГ - DS and РПГ-1 continuously recorded during test performance																		

3.6. MO-6 HAND CYCLE ERGOMETRY

Hardware:

GAMMA-1 equipment
ВБ-3 Cycle ergometer
УСИ ВАП-ККГ sensor
ГАММА-1 set
Wet wipes



Channel #	Signal description	Waveform on oscilloscope
II	ЭКГ- DS	

Figure 3.8 Outfitting Diagram and Reference Physiological Curves for MO-6

1. Install cycle ergometer into working position (see MO Book 1 Sect. 5.4.1 p. 5-15)
   Depress fixer latch and remove pedals
   Stow pedals in seat cover pocket

2. Adjust generator assembly and seat positions:
   Pull fixer latch sleeve on the required rod in arrow direction
   Adjust generator assembly or seat position as convenient
   Release fixer latch sleeve
   Move generator assembly or seat position until captured (wait for audible click)

3. Setup the required hardware

3.6.1. INITIAL SETUP

(00:10:00)

NOTE

Assistant helps Subject with outfitting

1. Unstow ПКО ЭКГ-ККГ biomed harness belt from УСИ ВАП-ККГ bag	Assist Subject with outfitting
2. Moisten ЭКГ belt electrode pads using conductive fluid from ГАММА-1 set	
3. Don ЭКГ-ККГ harness at 5th intercostal level (Figure 3.8 p. 3-33) Adjust straps and belt to desired length	
4. Turn belt down Treat skin in electrode application areas, using wet wipe Apply electrodes to the body √ correct placement and good contact of ECG-DS electrodes with skin ◅ ECG electrodes conform to corresponding “D", "S", "O" lables on ПКО biomed harness	
5. Mount the cycle ergometer ⭳ **[X]** on cycle ergometer control panel	

6.	connector ПКО ЭКГ-ККГ →|← connector EKG HARNESS on MEDICAL EXAM PANEL
7.	⏻ <GAMMA> MED SYS on ППС-24 ⏻ PANEL PWR on MEDICAL EXAM PANEL □ LED PANEL PWR on MEDICAL EXAM PANEL
8.	sw OPERATIONAL MODES on MEDICAL EXAM PANEL → OSC
9.	On OSCILLOSCOPE: sw OPERATIONAL MODES → SWEEP sw BRIGHTNESS → middle position sw SWEEP VELOCITY→ middle position
10.	◅ presence and proper waveform of signals (Figure 3.8 p. 3-33), sequentially toggle on MEDICAL EXAM PANEL: GAIN II → 5 OSCILLOSCOPE → II (ЭКГ)

NOTE

Gain settings for all recorded physiological curves may be changed on **MCC GO**

3.6.2. MCC CONTROLLED OPERATION

(Telemetry Session)

1.	T.0 At complete rest (physiological parameters before test are being recorded)	On MEDICAL EXAM PANEL: sw OPERATIONAL MODES → TLM GAIN Wait for 10 sec, then sw OPERATIONAL MODES → OSC
2.	Start rotating pedals backwards manually	◅ □ on display, set load setting 150 W by pressing right pb Δ on cycle ergometer control panel
	Manually rotate pedals backwards until completely exhausted	
3.	Complete rest (physiological parameters after test are being recorded)	
4.	T.КТМ (end of telemetry session)	

3.6.3. CLOSEOUT OPERATIONS

(00:10:00)

1.		PANEL PWR on MEDICAL EXAM PANEL ■ LED PANEL PWR on MEDICAL EXAM PANEL
2.		connector ПКО ЭКГ-ККГ ←|→ connector EKG HARNESS on MEDICAL EXAM PANEL
3.		<GAMMA> MED SYS on ППС-24
4.	Dismount cycle ergometer ↓ **[X]** on cycle ergometer control panel	
5.	Doff ПКО ЭКГ-ККГ Dry out ПКО ЭКГ-ККГ Stow ПКО ЭКГ-ККГ	

6. Stow cycle ergometer (see MO Book 1 Sect. 5.4.3 p.5-18)

3.7. MO-7 MEASURING CALF VOLUME (ИЗОГ)

Purpose:

Muscle atrophy evaluation

Hardware:

Calf volume measurement kit (ИЗОГ)

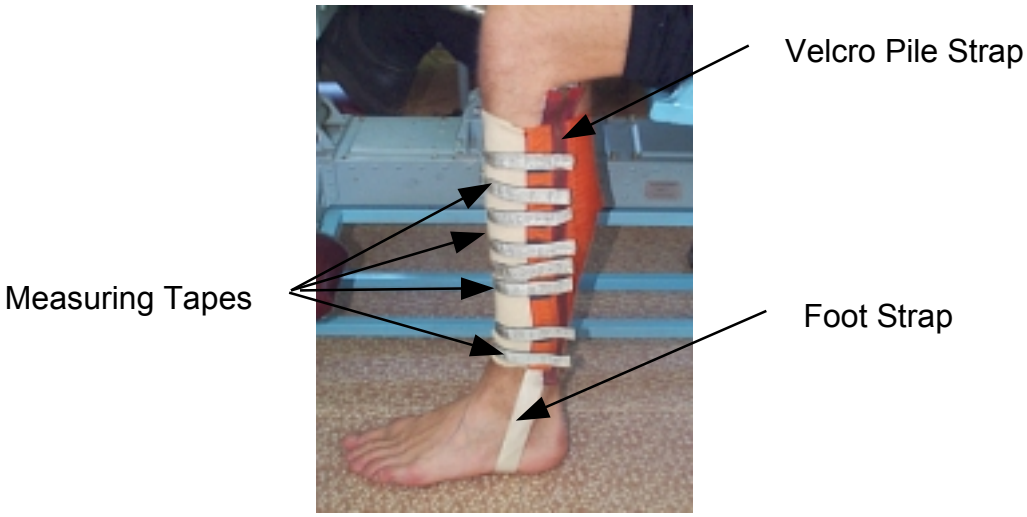


Figure 3.9 Calf Volume Measurement Device

NOTE

1. Perform measurements on the left leg
2. There is an individual calf volume measurement kit (ИЗОГ) for each crewmember
3. Do not overtighten ИЗОГ Velcro pile strap — just remove slack

1. Unstow ИЗОГ measurement device

2. Sit in any convenient location:
   Ensure foot and leg are at 90° to one another

3. Don ИЗОГ:
   foot strap – under foot
   zipper – on back of leg
   upper edge – right under kneecap
   Close zipper

4. Wrap measuring tapes around calf and secure with Velcro (do not overtighten!)

5. Read obtained values from the borderline between elastic and non-elastic elements

6. Record results into Table 3.4 p. 3-39, **report to MCC** (during comm pass)

7. Doff ИЗОГ and stow

For notes

Table 3.4

Name										
Date										
Tape #	Measuring tapes at different levels									
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										

Name										
Date										
Tape #	Measuring tapes at different levels									
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										

Table 3.4 (continued)

Name										
Date										
Tape #	Measuring tapes at different levels									
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										

Name										
Date										
Tape #	Measuring tapes at different levels									
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										

For notes

3.8. MO-8 BODY MASS MEASUREMENT

Hardware

ИМ Stand
Platform
Matching Unit (УС)
Mass Measurement Panel (УСВ)
Kit with cables
ИММ kit

3.8.1. SETUP FOR BODY MASS MEASUREMENT (ИМТ MODE)

1. Remove platform from ИМ stand
   Loosen platform locking screw
   Detach platform from stand

2. Install ИМ stand into working configuration (Figure 3.10 p. 3-42)

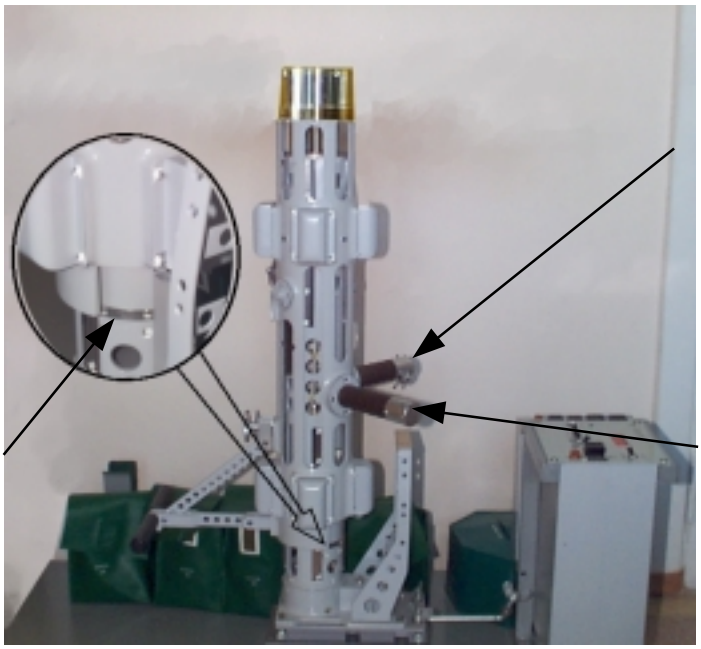


Figure 3.10 ИМ stand in working configuration (movable part is secured in neutral position)

3. Remove cover from ИМ stand
   Temp stow cover

4. Install platform onto ИМ stand (Figure 3.11 p. 3-43):
   Rotate platform with its tailpiece towards stand's foot bar
   Pivot platform onto movable tube of ИМ stand
   Secure platform on ИМ stand using platform lock latches

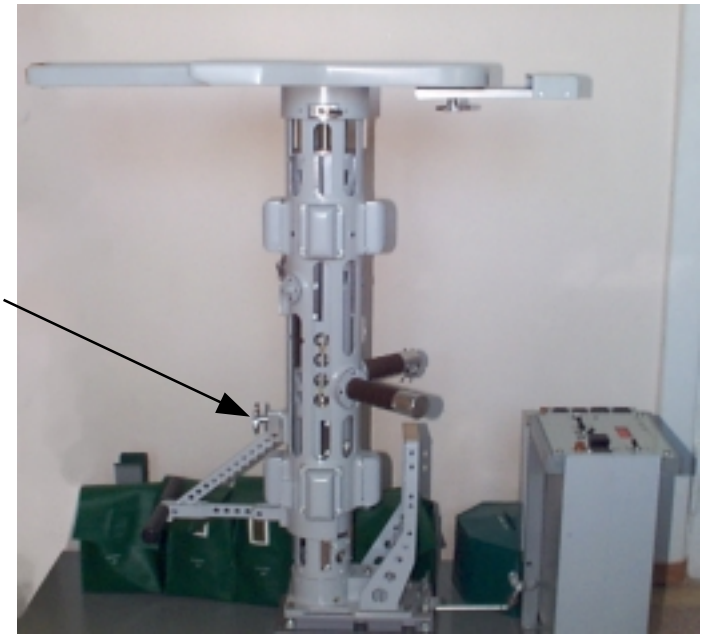


Figure 3.11 Mass Measurement Device [ИМ] in Body Mass Measurement Configuration [ИМТ]

5. Disengage latches of two locking screws with latches on stand
   Loosen two locking screws with latches

6. Determine number of oscillations until complete stop:
   ↓ trigger releases of locking handles
   Bring movable part of the stand toward its fixed base to the stop and then quickly let it go
   Count number of oscillations until complete stop
   Record the number in log sheet (see pp.3-50, 3-51)
   If number of oscillations <30 - wipe guiderails on the inner tube with wipe from ИММ kit and repeat step 6 **********

   * ********** *
   If number of oscillations <30 see MO Book 1
   Sect. 6.2.5 step 2 p. 6-35
   * ********** *

7. Unstow cable from cable kit
   Assemble configuration per Figure 3.12 p. 3-44
   connector X2 of cable 5A4.856.237 →|← РБС 10/3 power outlet

8. ⏻ РБС 10/3

MASS MEASUREMENT PANEL
MASS MEASUREMENT PANEL readout

9. □ LED PWR

□ 0000 **********

****

If ■ LED PWR or MASS MEASUREMENT PANEL readout:
See MO Book 1 Sect. 6.2.5 step 1 p. 6-35
If □ two-digit number on MASS MEASUREMENT PANEL readout
See MO Book 1 Sect. 6.2.5 step 3 p. 6-35

****

10. Pause for 5 min

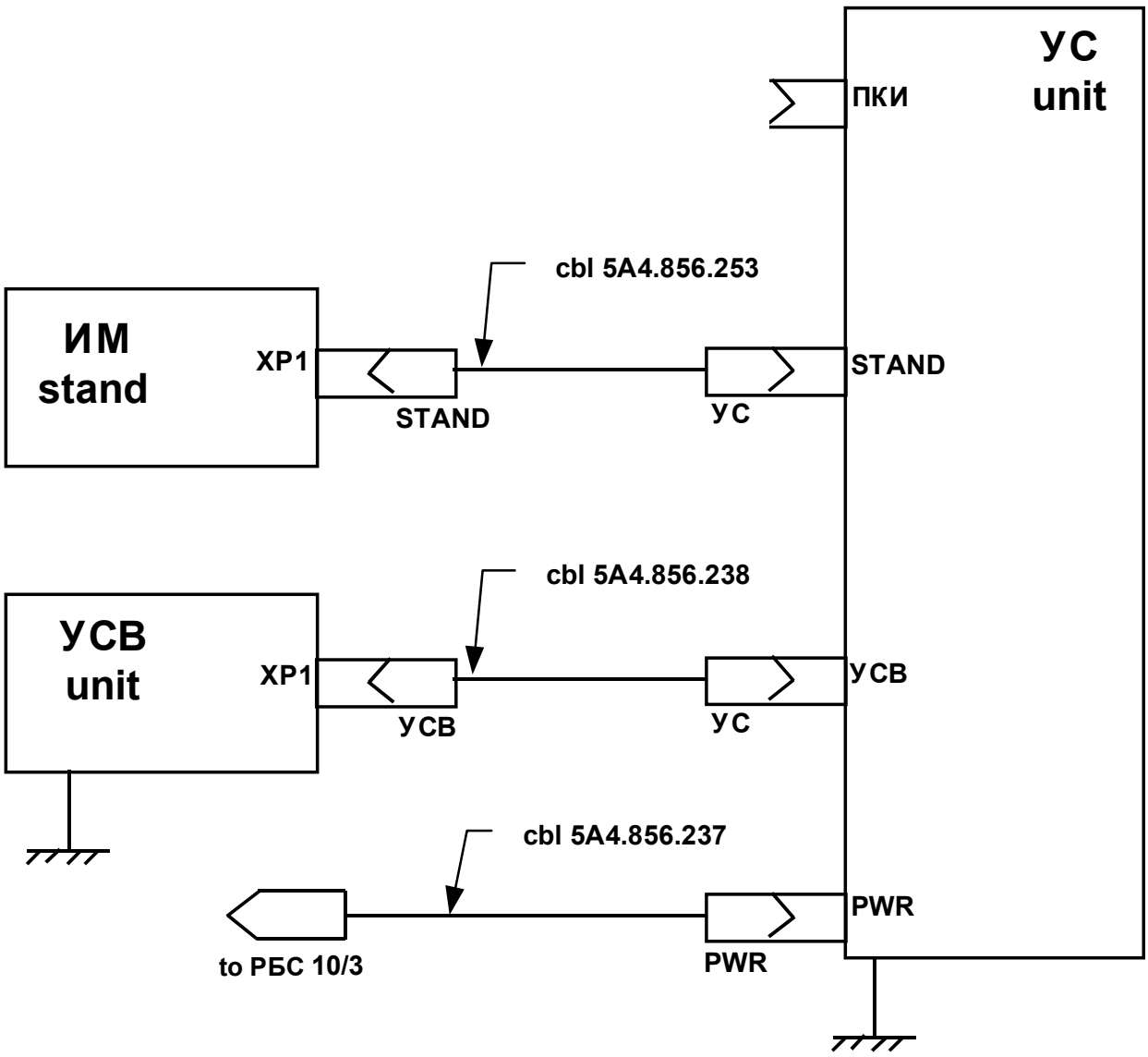


Figure 3.12 ИМ Stand Electrical Connection Diagram

3.8.2. BODY MASS MEASUREMENT

NOTE

1. Perform calibration prior to every first body mass measurement session
2. Repeat calibration 2-3 more times to provide more accurate measurements
3. Measure body mass only if Δ variation value <1 millisec
4. Perform calibration in case of continuous operation (over 30 min)

CALIBRATION

MASS MEASUREMENT PANEL

1. ⏻ BODY MASS MEASUREMENT
   ⏻ CALIBRATION

2. ↓ trigger of ИМ stand locking handle (left)
   ↓ locking (right) handle trigger release

3. Pull device's movable part towards its base until captured

ИМ stand

4. ↓ trigger of start (right) handle
   ■ MASS MEASUREMENT PANEL readout
   ◅ movable part oscillations (after 3 sec)

MASS MEASUREMENT PANEL

ИМ stand

MASS MEASUREMENT PANEL readout

5. ◅ □ Tпч values (oscillation period) of the next type

Record obtained Tпч value in log sheet (pp. 3-50, 3-51)

6. Repeat steps 2-5 two-three more times

7. Determine Δ variation value per formula Δ = ($Тпч_{max}$ – $Тпч_{min}$)/2
◅ Δ variation value < 1millisec (1 is the least significant bit unit)
****
* ********** *
If Δ variation value > 1millisec:
√ MCC
* ********** *

NOTE

If Δ variation value >1 millisec, it may be due to the following:

1. Oscillation measurement system of ИМ stand is not operating properly
2. ИМ stand movable part is obstructed by some factors
3. There is a significant vibration interference factor in the whole system

MEASURING BODY MASS

8. In ИМ stand neutral position (Figure 3.10 p. 3-42)
↓ locking (left) trigger release

MASS MEASUREMENT PANEL

9. ⏻ OPERATION

10. Install foot bars in working position:
Release locking screw (see Figure 3.11 p. 3-43)
Lower foot bars and secure in working position by tightening locking screw

11. Take required position on the platform:
Holding the platform's middle part, pull oneself onto it
Rest with abdomen on platform
Place feet (with platform tailpiece being between legs) on foot bars (holding platform with hands)
Press thighs against bottom of platform and secure legs from feet to thighs between supports and platform
Adjust the pull-out chin rest at a convenient height and tighten locking screw to secure in position

12. Place hands on handles (thumbs on end of handles, index fingers – on triggers)
↓ triggers of ИМ stand locking (left) handle
↓ start (right) triggle release

13. Place right hand on ИМ stand base handle
Pull movable part downwards to the stop
Press chin down to the pull-out chin rest
Press oneself closer to platform, exhale, and hold breath

ИМ stand
MASS MEASUREMENT PANEL
ИМ stand

14. ↓ start (right) handle trigger
■ MASS MEASUREMENT PANEL readout
◅ movable part oscillations (after 3 sec)

MASS MEASUREMENT PANEL readout

15. □ digits
Relax and resume breathing

16. Record the obtained value in log sheet (pp. 3-50, 3-51)

17. Repeat steps 8 - 16, pp. 3-46 – 3-47 two more times

18. In ИМ stand neutral position, (Figure 3.10 p. 3-42),
↓ left trigger release

19. Dismount platform

20. Determine Δ variation value per formula $\Delta = (M_{max} — M_{min})/2$
◅ Δ variation value < 0.06 kg

NOTE

1. Difference between obtained results should not exceed 0.06 kg
2. If otherwise, crew member's position on ИМ stand should be corrected, or system's own vibration interference is too high

21. Tighten two locking screws on the ИМ stand outer tube
Engage latches on two locking screws

22. Install foot bars into storage position:
Release locking screw (Figure 3.11 p. 3-43)
Raise foot bar and secure it in storage position, by tightening foot bar locking screw

3.8.3. CLOSEOUT OPERATIONS FOR ИМТ MODE OPERATIONS

MASS MEASUREMENT PANEL

1. ⚲ РБС 10/3
   ■ LED PWR
   cnctr X2 cbl 5A4.856.237 ←|→ РБС
   Disassemble configuration Figure 3.12 p. 3-44
   Stow cable into Kit with cables

2. Release platform locking latches
   Platform ←|→ ИМ stand

3. Put cover on ИМ stand (labeling is on the right)

4. Stow ИМ stand
   Stow platform on ИМ stand and secure with tightening locking screw

For notes

Log Sheet

Date:	Number of oscillation until complete stop:							
	Calibration				Measurement Result			
Name	Тпч1	Тпч2	Тпч3	Average	M1	M2	M3	Average

Date:	Number of oscillation until complete stop:							
	Calibration				Measurement Result			
Name	Тпч1	Тпч2	Тпч3	Average	M1	M2	M3	Average

Date:	Number of oscillation until complete stop:							
	Calibration				Measurement Result			
Name	Тпч1	Тпч2	Тпч3	Average	M1	M2	M3	Average

Date:	Number of oscillation until complete stop:							
	Calibration				Measurement Result			
Name	Тпч1	Тпч2	Тпч3	Average	M1	M2	M3	Average

Log Sheet

Date:	Number of oscillation until complete stop:							
	Calibration				Measurement Result			
Name	Tпч1	Tпч2	Tпч3	Average	M1	M2	M3	Average

Date:	Number of oscillation until complete stop:							
	Calibration				Measurement Result			
Name	Tпч1	Tпч2	Tпч3	Average	M1	M2	M3	Average

Date:	Number of oscillation until complete stop:							
	Calibration				Measurement Result			
Name	Tпч1	Tпч2	Tпч3	Average	M1	M2	M3	Average

Date:	Number of oscillation until complete stop:							
	Calibration				Measurement Result			
Name	Tпч1	Tпч2	Tпч3	Average	M1	M2	M3	Average

For notes

3.9. MO-9 BIOCHEMICAL URINE TEST

Used Hardware:

(CENTER) POWER UNIT
УРОЛЮКС (Urilux) unit (with pwr cbl labeled 'УРОЛЮКС-БК')
Dry wipes
УРОЛЮКС (Urilux) kit:
canister with measuring strips labeled 'Control -Test M'
paper for built-in printer
cartridge for built-in printer
УБИМ-10У kit

3.9.1. URILUX UNIT SETUP

1. Unstow unit
   Secure unit at work station

2. √ printer has enough paper
   If otherwise, proceed per MO Book 1 Sect.6.8.1 p.6-58

3. Assemble configuration:

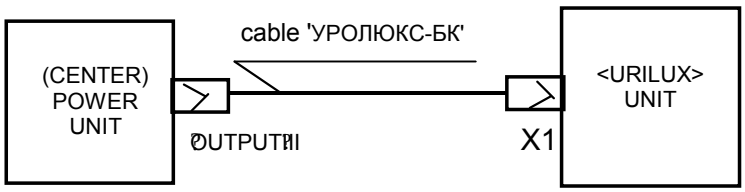


Figure 3.13 Urilux Connection Diagram

(CENTER) POWER UNIT

(CENTER) CONNECTOR
CHECK

4. sw VOLTAGE V → 9
   sw CHECK V → 5…20
   sw CHECK → POWER UNIT
   sw **V** – **Ω** → V

ППС-24

(CENTER) POWER UNIT

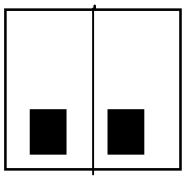
(CENTER) CONNECTOR
CHECK

5. <CENTER> MED SYS
   PANEL PWR □ LED (green)
   PANEL PWR
   readout shows 09.00 ± 0.5

3.9.2. CHOOSING MEASURING UNITS

(if necessary)

1. Open printer cover
2. √ sw UNITS → lower position using pointed object (Metric System)



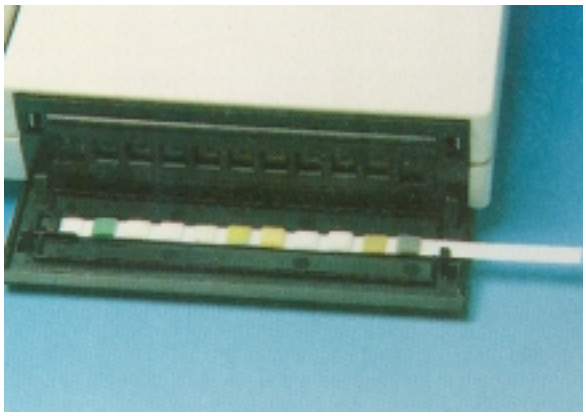
3. Close printer cover

3.9.3. UNIT CALIBRATION

NOTE

1. Device УРОЛЮКС should be calibrated with the help of calibration strips Control-Test M from УРОЛЮКС kit after its initial activation, and also every time unit was not in operation for more than 7 days
2. Each calibration strip can be used only once
   Retrieve a calibration strip from the canister just before calibration
3. Do not touch photometric (square-shaped) areas on strip with bare fingers

1. Retrieve canister labeled Control-Test M from УРОЛЮКС kit
2. Retrieve a calibration strip from canister
   Close canister
3. Open the measuring chamber cover
4. Insert a calibration strip (with gray field upwards) into the groove on the inside of the measuring chamber cover



5. Close cover of the measuring chamber (until a click is heard)

6. ↓ pb START (on unit upper pnl) and √ pb START
   after printer starts operation

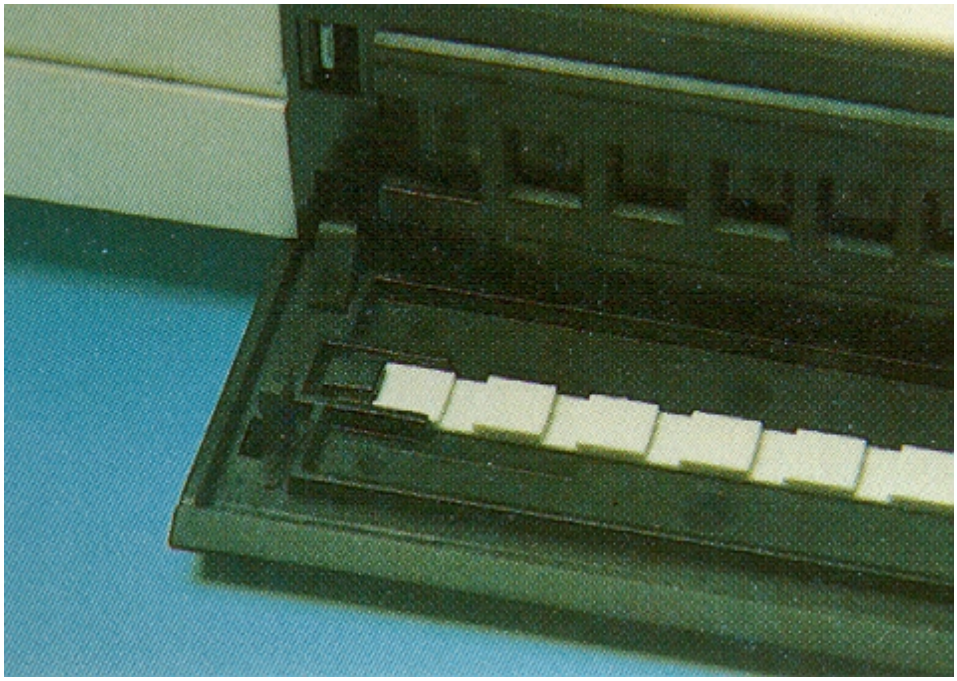
7. ◄ message on the tape:
   START CALIBRATION

   ↓ pb START (to initiate calibration mode)
   ◄ green LEDs light up sequentially from left to right on unit's upper panel

8. ◄ □ on all LEDs (green)
   ◄ message:
   CALIBRATION OK

****
If during calibration:
□ One or more red LEDs
Unit prints out the following message:
CALIBRATION ERROR
Obtain a new calibration strip
Repeat steps 2-7 p. 3-54, 3-55
If **CALIBRATION ERROR** message is printed again
(see Sect. 3.9.8 p. 3-61)
****

9. Remove calibration strip from the unit and discard



3.9.4. URINE TEST

1. Retrieve УБИМ-10У kit from УРОЛЮКС kit

2. Open canister, unstow a measuring strip from canister of УБИМ-10У kit
   Recap the canister (immediately)

3. In toilet, apply urine (middle portion of void) on measuring strip squares
   Blot excess urine with dry wipe to get rid of urine drops on measuring srip and reagent zones

4. Open measuring chamber cover
   Insert measuring strip (with gray field upwards) into the groove on inside of the measuring chamber cover

5. Close cover until it clicks

****

****

If no click of the lock was heard:
Open cover
Verify if the measuring strip was inserted all the way to the stop

****

6. ↓ pb START

   ◅ printout:
   NUMBER (sample serial number)
   NAME (patient's name)
   DATE (date of test)
   NOTES (additional remarks)
   All necessary information on each of these fields may be also handwritten on the tape

7. LED (preparation for measurement)
   In the measurement preparation mode, LEDs light up sequentially from left to right (the last three LEDs glow red)
   In the measuring mode, LEDs light up sequentially from right to left

NOTE

Measurement sequence completes either automatically or upon repeated ↓ pb START

NOTE

1. If the measured values are within physiological norm, □ LEDs (green)
2. If the measured values are not within the physiological norm, □ LEDs (red), and the value in question on the printout is marked with an asterisk

8. After the printing is done:
   Remove the measuring chamber cover
   Discard the used measuring strip
   Tear off the tape with the printout and **report to MCC** the first two parameters (Sg and pH) and those marked with asterisks

3.9.5. CLOSEOUT OPERATIONS

(CENTER) POWER UNIT
(CENTER) CONNECTOR CHECK
ППС-24

1. PANEL PWR
   PANEL PWR
   <CENTER> MED SYS

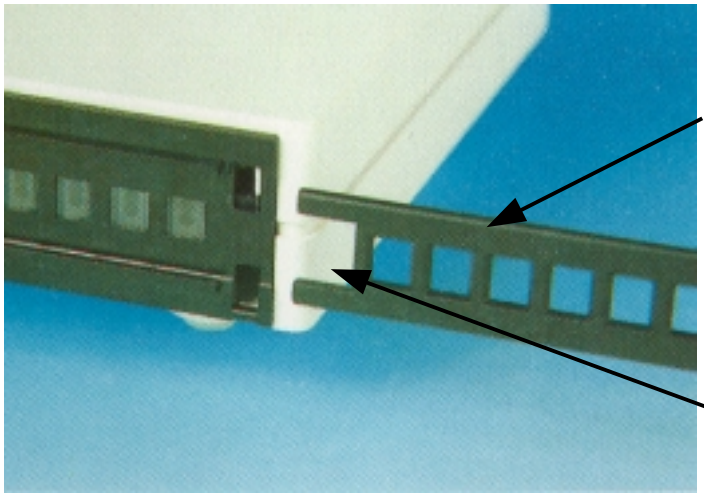
2. Disassemble the circuit (see Figure 3.13 p. 3-53)

3. Remove the chamber cover
   Carefully, trying not to scratch optics, remove the optical windows screen by pulling it to the right along the guiderails

4. Wipe the chamber cover and optical windows screen (without touching the optics) with wipe
   If additional cleaning is required use tissue from Reflotron-4 Kit to clean measurement chamber

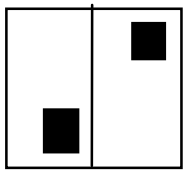
5. Push the optical windows screen in along the guiderails into place with the larger windows to the left, making sure it is installed all the way to the stop

6. Close the chamber cover FLAP



3.9.6. MEASURING CHANNEL CHECK

1. Open printer cover and set sw UNITS into positions shown below



2. Unstow a calibration strip from canister labeled CONTROL TEST-M
   Remove cover and insert strip into measuring chamber

3. Close FLAP

4. ↓ pb START (momentarily)
   ◅ the following messages are printed:

CHECK MEASUREMENT
Software Version V 1.06

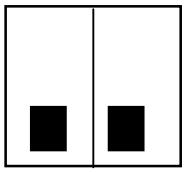
Chip	Version	UX 1.6
1		XXX
2		XXX
3		XXX
4		XXX
5		XXX
6		XXX
7		XXX
8		XXX
9		XXX
10		XXX
11		XXX

5. Measured parameters are considered valid if they are within the limits, shown below:

1		636-650
2		636-650
3		636-650
4		636-650
5		636-650
6		636-650
7		636-650
8		636-650
9		636-650
10		636-650
11		636-650

6. Open printer cover

7. sw UNITS → lower position using pointed object (Metric System)



8. Close printer cover

3.9.7. MEASURING STRIP VISUAL EVALUATION

NOTE

1. In the event of irreparable failure of the unit, crew may try to visually evaluate test parameters, using color-coded scale on the canister with measuring strips, from УБИМ-10У kit or Combur 10 Test UX (see Figure 3.14 p. 3-60)
2. Visual evaluation must be performed in the vicinity of the table, since evaluation accuracy greatly depends on adequate illumination of both color-coded scale and measuring strip reagent zone

1. Retrieve a measuring strip from canister
   Immediately recap canister

2. In toilet, apply urine (middle portion of void) on measuring strip squares
   Blot excess urine with dry wipe to get rid of urine drops on measuring strip and reagent zones

3. Wait for 30 seconds, then bring measuring strip to the color scale on УБИМ-10У canister
   Orient the measuring strip squares against those of the color scale
   (the square, nearest to crew member's fingers, corresponds to **A** horizontal)

4. Compare the coloring of reagent zones on measuring strip squares with those on color scale
   Coloring intensity assessment for parameter **B** should be conducted the last
   Record, to which vertical group the coloring of each reagent zone on the measuring strip corresponds (for example, А-6, Б-3, В-3, etc.)

5. Report the obtained results to **MCC** in the following order:
   А-Б-В-Г-Д-Е-Ж-З-И-К

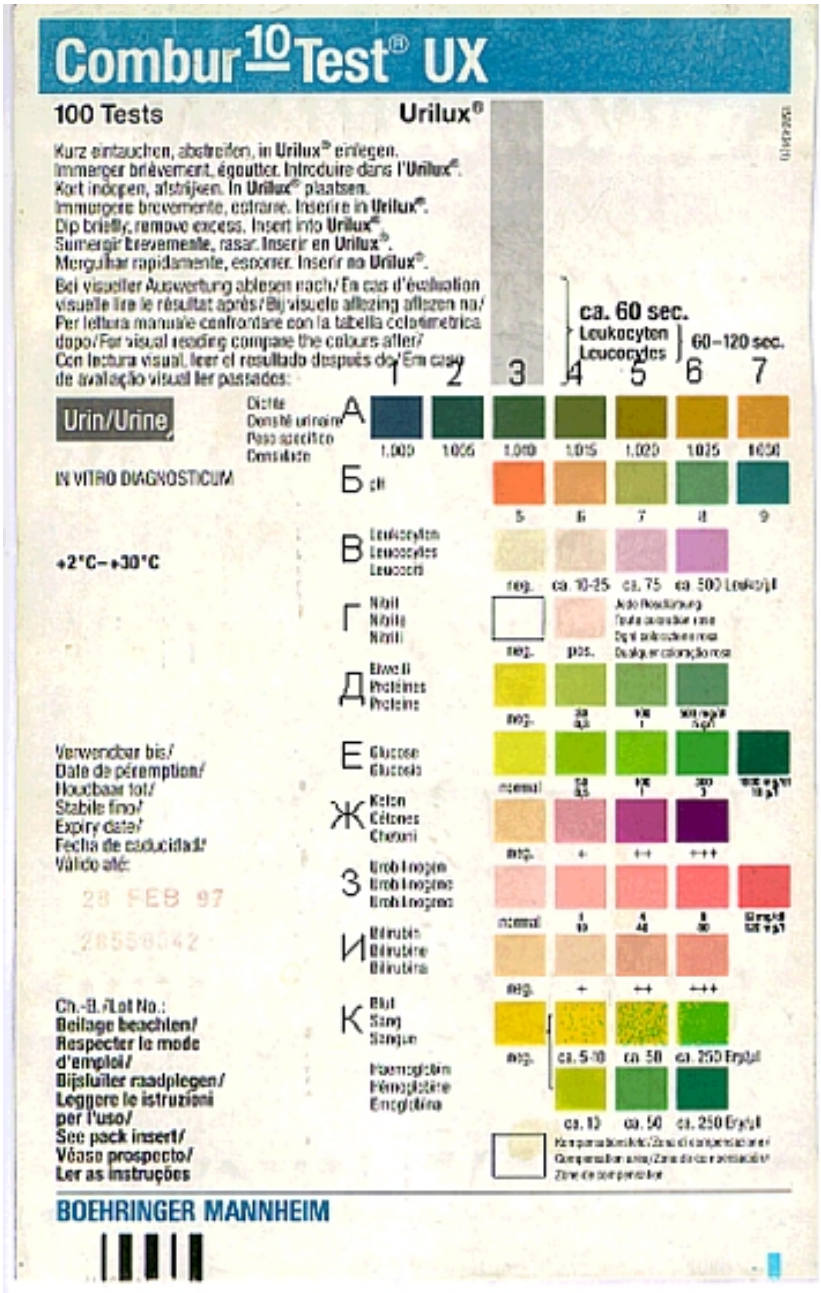


Figure 3.14 Color scale for Visual Evaluation of Measuring Strips (Standard)

3.9.8. TROUBLESHOOTING

#	Symptom	Probable Cause	Corrective Action(s)
1.	Every time after connection to power source, УРОЛЮКС device asks for calibration by printing the message START CALIBRATION	During self-check, performed after each powerup, the device could not find any required calibration data	Perform calibration (see Sect 3.9.3 p. 3-54)
2.	The device prints CALIBRATION ERROR	The calibration characteristics are out of the range	Make sure that screen, cover of the measuring unit and measuring strip of the unit are in the correct position Repeat calibration using a new strip, taken out from canister immediately before calibration Clean optical windows and their screen (see Sect 3.9.5 steps 3-6 p. 3-57)
3.	The device prints CALIBRATION ERROR! WARNING	Calibration strip was inserted incorrectly or parameters of calibration are below the normal values	See step 2 p. 3-61
4.	The device prints CALIBRATION ERROR! DEFECT!	The calibration strip is not inserted or inserted incorrectly; Cover of the measuring chamber is not closed; The calibration parameters are lower than normal	See step 2 p. 3-61 Then repeat calibration If the message CALIBRATION ERROR! DEFECT! is printed again, the device may be malfunctioning

#	Symptom	Probable Cause	Corrective Action(s)
5.	The device prints MEASUREMENT ERROR!	Cover of the measuring chamber is opened (light from the outside gets in) Measuring strip is not inserted The strip is misplaced Crew member forgot to moisten the strip with urine before the test The strip contacted with urine, but dried before the test	Insert measuring strip correctly and firmly close cover of the measuring chamber Repeat measurements, using a new measuring strip Make sure all the reagent areas of the measuring strip are moistened with urine
6.	Instead of individual parameter value, the device prints ERROR	Reagent zone (separate square on the measuring strip) is very dark The measuring channel does not function	Inspect the strip If the reagent zone is very dark, enter on the tape by hand "more than max." (for example, SG > 1.030; PRO > 5g/l, etc.) If the reagent zone coloring is similar to that on the canister with strips, i.e. allows to make a definition, the device may not function properly Clean optics of the device (see Section 3.9.5 p. 3-57) Repeat test using a new strip The device is defective, if it again prints ERROR

#	Symptom	Probable Cause	Corrective Action(s)
7.	The device prints CHECK MEASUREMENT, the chip software version number, and then three-digit codes without the names of parameters	The dip switches UNITS are in a non-standard position	Set the dip switches into the required position (see Sect. 3.9.2 p. 3-54)
8.	The device prints CHIP ERROR	Memory module (the little square block with a connector), located under the printer cover has a poor contact inside the connector The memory module has a defect	Disconnect the device from the power source ↓ on the memory module, to restore good contact with the device connectors If the device again prints CHIP ERROR – it is defective: disconnect the device from the power source
9.	The data provided by the device does not match that received visually (i.e. discrepancy is greater than one step of color scale, or two steps – for SG parameter)	Measuring strip was inserted incorrectly Cover of the measuring chamber is not fully closed Unusual coloring Reaction time for serial measurements is not observed (see steps 2-6 on pp. 3-61 - 3-62) Voltage drop; cross talk from other hardware	Recalibrate the device; Repeat test with a new measuring strip; Remove the source of interference

#	Symptom	Probable Cause	Corrective Action(s)
10.	The printer would not print	The device is out of paper	Install a new roll
		No tape in the cartridge or the tape is too dry	Replace the cartridge
		No power is supplied to the device	Check power cord and connector connection
		The printer drive does not work	Switch the device off and on If the problem persists, the device is defective. Cancel further operation
11.	If the УРОЛЮКС device does not react to pressing of pb START after connection to the power source, or, during operation, the printer motor runs constantly, without stopping, or there are any other defects	The device can be returned to the standby mode with momentary pressing pb RESET located on the front panel of the device under the printer cover Pb RESET should be pressed with a long pointed object, since it is located below the panel level	

3.10. MO-10 DETERMINING HEMATOCRIT NUMBER

Hardware:

M-1100 kit
Reflotron-4 Kit
Battery kit
Perforator (from Reflotron-4 Accessories Kit)
Dry wipes

3.10.1. MEASURING HEMATOCRIT NUMBER

1. Unstow minicentrifuge from M-1100 kit
   sw POWER → ON ■ red LED (under the cover) **********

   ****
   If □ red LED (on minicentrifuge):
   Replace centrifuge batteries (Sect. 3.10.2 p. 3-68)
   ****

2. sw POWER → OFF
   ↓ on cover latch
   Open minicentrifuge cover

3. Move retainer to upper position by pressing levers to head of retainer

4. Retrieve canister with microcapillary tubes from Reflotron-4 Kit
   Temp stow canister

5. Retrieve orange platform from Reflotron-4 Kit
   Insert orange platform into perforator to stop (protrusions go into opening)

6. Retrieve lancet from Reflotron-4 Kit pocket
   Place lancet into perforator:
   Take perforator in your hand
   ↓ on perforator – press to stop (to click) and hold
   Place lancet into perforator (through opening in orange platform)
   Uncap lancet by twisting off protective cap (do not discard cap)
   ↓ on perforator
   Temp stow perforator

7. Obtain bactericidal tissue from Reflotron-4 Kit
   Treat finger tip to be punctured
   Stow bactericidal tissue in Reflotron-4 Kit pocket

8. Perform blood draw:
   Take perforator in your hand and firmly press finger tip to orange platform of perforator to activate the perforator trigger mechanism
   Temp stow perforator

9. If finger needs to be punctured again:
   ↓ on perforator until lancet needle appears (turn away from eyes)
   Recap lancet
   ↓ on perforator to stop
   Extract lancet and discard
   Repeat steps 6-8 pp.3-65 - 3-66

10 Retrieve forceps from case
   Using forceps, extract two microcapillary tubes from canister (detaching adhesive tape)
   Take both microcapillaries in your hand
   Stow forceps back into case

11. Squeeze out a drop of blood and blot it up using a dry wipe
    Squeeze out another drop of blood

12. Completely fill both microcapillaries with blood (make sure they do not touch each other)

13. Install one filled microcapillary into nominal position in the minicentrifuge:
    Pressing one end into seat gasket on centrifuge tray rim,
    insert other end into respective slot on the retainer

14. Install next microcapillary in the same manner and directly opposite to the first one, while holding the first one with finger (both are located on the same diameter of tray)
    ↓ on retainer head

CAUTION
To avoid breaking microcapillaries, make sure they are filled equally and are fully seated in centrifuge tray

15. √ all microcapillaries are installed at full depth of their seats and are completely horizontal
    If otherwise, quickly move retainer to upper position and repeat steps 13-14

16. Wipe finger with tissue
Cover punctured finger with bactericidal band-aid from Reflotron-4 Kit

17. Close minicentrifuge cover to click
sw PWR (on centrifuge) → ON ■ LED (red) (located under cover)

18. After centrifuge comes to a complete stop:
sw PWR → OFF (on centrifuge)

19. Open centrifuge cover by depressing cover release button

20. Read markings on centrifuge plate that correspond to of red/clear interface (use magnifier from M-1100 Kit case)
Record results in Table 3.5 p. 3-70 and report them to **MCC** during comm pass

21. Retainer → to upper position
Using forceps, remove microcapillaries from minicentrifuge and discard
If necessary, clean seats with gauze or brush
Close centrifuge cover

22. ↓ on perforator until lancet needle appears (turn away from eyes)
Recap lancet
↓ on perforator to stop and remove lancet
Discard into sharps container:
lancet
orange platform

23. Stow:
Minicentrifuge, magnifier and brush into case of M-1100 kit
Canister with microcapillaries into Reflotron-4 Kit
Discard used lancet and orange platform
Stow M 1100 kit and Reflotron-4 Kit
Place perforator into Reflotron-4 Accessories Kit

3.10.2. REPLACING MINICENTRIFUGE BATTERY SET

1. Unstow minicentrifuge from case of M-1100 kit
2. √ sw PWR → OFF
3. Open battery compartment by sliding latches LOCK and ZU by sliding them against arrow direction (see Figure 3.15 p. 3-68)
4. Remove batteries from minicentrifuge battery compartment
5. Unstow a new set of batteries
   Install new batteries into minicentrifuge battery compartment (observing correct polarity)
6. Install batteries in minicentrifuge battery compartment
7. Lock latches LOCK and ZU on battery compartment by sliding them in arrow direction to stop
8. Discard used batteries

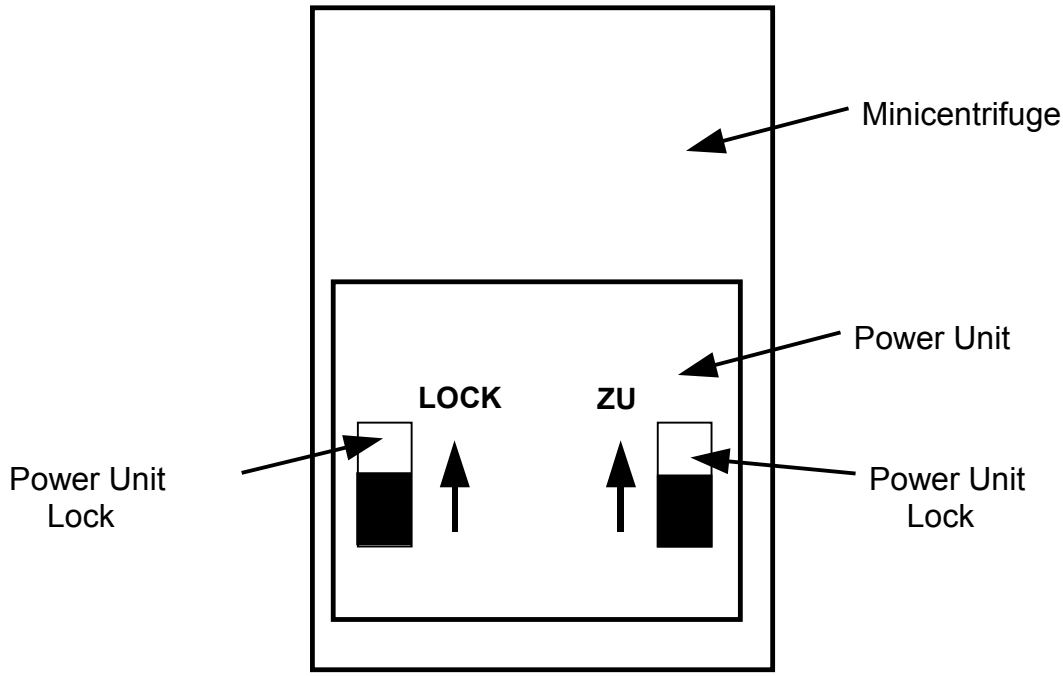


Figure 3.15 Minicentrifuge M-1100 (Bottom View)

For notes

Table 3.5

Name	Date	Cap. 1	Cap. 2	Date	Cap. 1	Cap. 2

Table 3.5 (continued)

Name	Date	Cap. 1	Cap. 2	Date	Cap. 1	Cap. 2

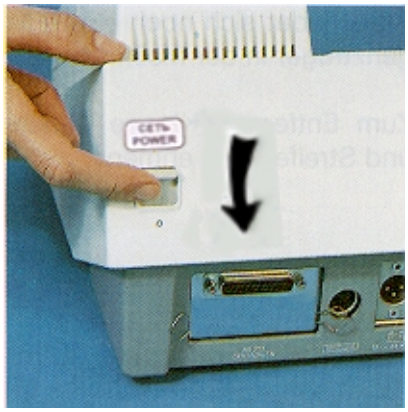
For notes

3.11. MO-11 BIOCHEMICAL BLOOD ANALYSIS

3.11.1. INITIAL SETUP

1. Secure at worksite:
   Reflotron-4 analyzer
   Reflotron-4 Kit
   Canisters with Reflotron-4 measuring strips
   Case with Reflotron-4 Accessories Kit
   Dry wipes

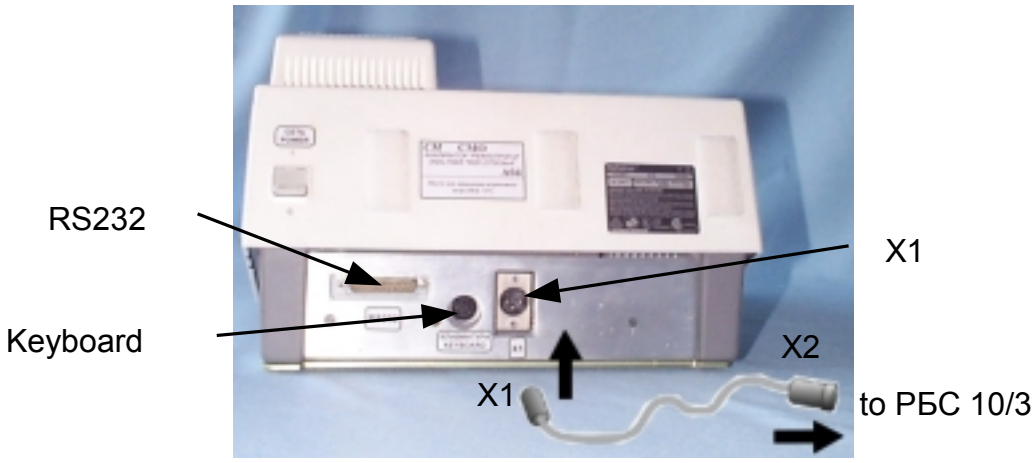
2. sw POWER → 0



3. Retrieve power cable from Accessories Kit

4. connector X1 of power cable →|← connector X1 on analyzer back panel

5. connector X2 of power cable →|← connector X2 РБС 10/3



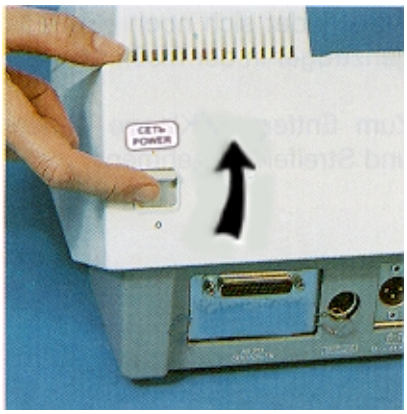
6. Retrieve pipette and perforator from Accessories Kit

7. Secure them on analyzer front panel (using Velcro)

8. Unstow a waste bag from Reflotron-4 Kit
   Secure bag with Velcro on analyzer front panel

9. ☝ РБС 10/3

10. sw POWER → 1
    □ LED (green) on analyzer front panel



11. ◅ sequential appearance of following messages on screen:

NOTE

1. DD.MM.YY – day, month, year
2. HH.MM.SS – hours, min, sec
3. MXX.XX CXX.XX – Manufacturer's alphanumeric code, specifying batch number and version of software
4. Symbols ** indicate analyzer warm-up time in seconds
5. Screen messages that are listed in onboard instruction correspond to nominal operation of analyzer

ДД.ММ.ГГ ЧЧ:ММ:СС REFLOTRON MXX.XX CXX.XX

ДД.ММ.ГГ ЧЧ:ММ:СС ЖДИТЕ ПРОГРЕВ ** СЕК

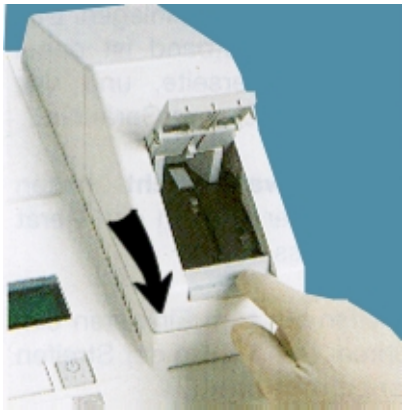
12. ◅ after warm-up time runs out the following message appears on screen:

ДД.ММ.ГГ ЧЧ:ММ:СС ГОТОВ К РАБОТЕ

3.11.1.1. DEVICE FUNCTIONAL CHECK

1. Retrieve CHEK canister with calibration strips from REFLOTRON-4 Kit
   Remove calibration strip from CHEK canister, do not touch strip with magnetic code by hands
   Immediately recap canister
   Restow canister

2. Open measuring chamber cover by depressing pb labeled FLAP



3. ◅ message on screen:

ДД.ММ.ГГ ЧЧ:ММ:СС ВСТАВЬТЕ ПОЛОСКУ

NOTE

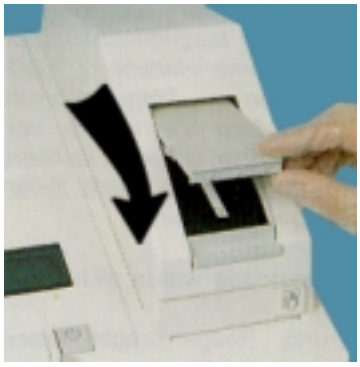
1. Insert strip parallel to horizontal plane of the analyzer
2. Orient strip so that its gray field faces up and towards analyzer

4. Insert calibration strip into measuring chamber (all the way to click), making sure switch П on the transporter has moved to its lower position

5. ◅ message on screen:

ДД.ММ.ГГ ЧЧ:ММ:СС ЗАКРОЙТЕ ДВЕРЦУ

6. Close FLAP



7. ◅ message on screen:

ДД.ММ.ГГ ЧЧ:ММ:СС ЧТЕНИЕ МАГНИТНОГО КОДА

NOTE

1. Symbols *** indicate required measuring time
2. During measurement, time is counted down

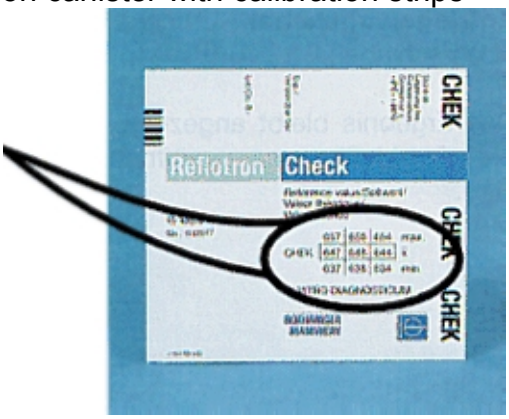
ДД.ММ.ГГ ЧЧ:ММ:СС CHEK PE3 ЧЕРЕЗ *** СЕК

8. ◅ message on screen (upon completion of measurement) (symbols *** indicate measuring results):

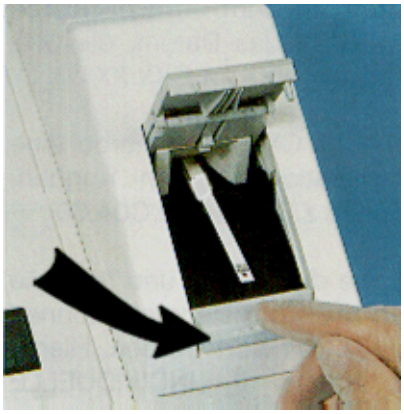
ДД.ММ.ГГ ЧЧ:ММ:СС CHEK *** *** ***

9. Compare obtained results with data range on canister with calibration strips
Check is considered successful if data
on readout is within range specified
on canister with calibration strips

If otherwise – **report to MCC**



10. Open FLAP
by depressing pb labeled FLAP

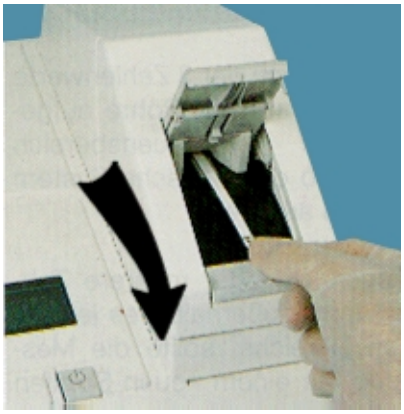


11. ◅ message on screen:

ДД.ММ.ГГ ЧЧ:ММ:СС УДАЛИТЕ ПОЛОСКУ

12. While holding end of calibration strip, set switch П to upper position

13. Remove calibration strip from measuring chamber



14. Discard strip into waste bag
Close FLAP

3.11.2. MULTIPLE-PARAMETER TEST

NOTE

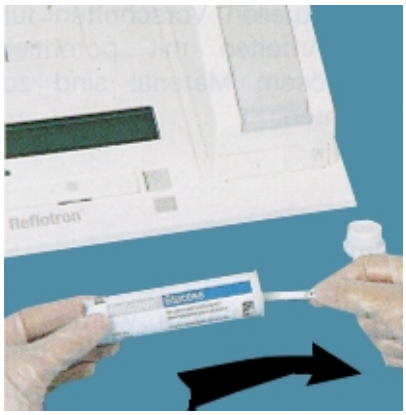
1. List of measured parameters – per radiogram
2. Microvette EDTA tubes (with red cap) are used to measure HDLP cholesterol only
3. To expedite the process, the required amount of blood is first drawn into a Microvette tube. The following needs to be kept in mind:
   - Blood collected into the Microvette tube can be used to measure all required parameters, except hemoglobin (HB), which is measured immediately after finger blood collection with pipette
   - Glucose (GLU) and bilirubine (BIL) concentrations must be determined within 10 minutes after blood collection into the tube

1. Unstow pipette and perforator from Reflotron-4 Accessories Kit

2. Unstow waste bag from Reflotron-4 Kit
   Secure waste bag on analyzer

3. Unstow canister with measuring strips for blood parameters to be measured from Reflotron-4 Kit

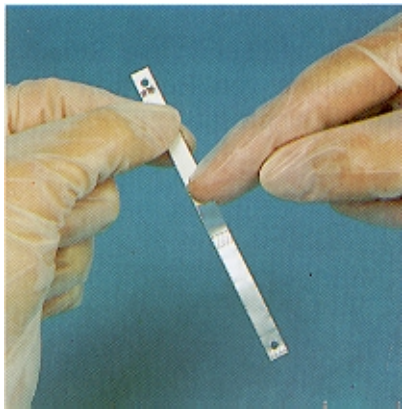
4. Open canister
   Take measuring strip from canister
   Close canister with cover (immediately)
   Restow canister

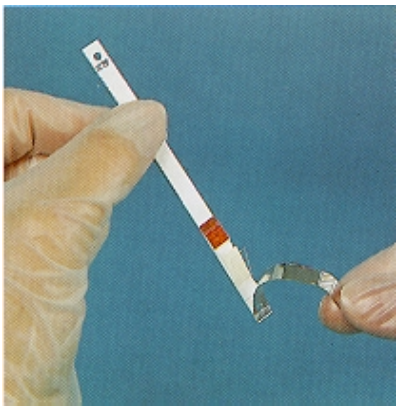


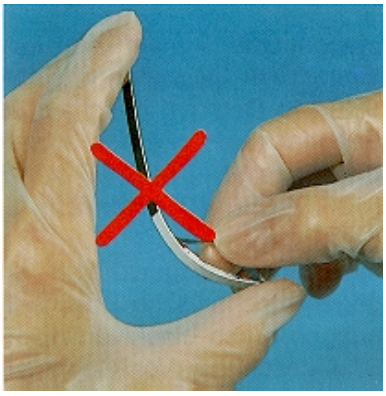
NOTE

After foil is removed, hold strip by labeling area only

5. Remove protective foil from the strip and discard foil into waste bag (if necessary)







Do not bend the strip!

6. Insert strip into slot on measuring chamber

7. Unstow package with pipette tips from Reflotron-4 Kit
   Open pack with pipette tips

8. Put tip on pipette
   Retrieve tip from pack using pipette

9. Secure pipette with tip on analyzer front panel

10. Unstow orange platform from Reflotron-4 Kit
    Insert orange platform into perforator to stop (protrusions go into opening)

11. Unstow lancet from Reflotron-4 Kit pocket
    Insert lancet into perforator:
    Take perforator in hand
    ↓ on perforator to stop (until it clicks) and hold
    Insert lancet into perforator (via opening on orange platform)
    Remove turning protective cap on lancet (do not discard protective cap)
    √ on perforator
    Temp stow perforator

12. Unstow Microvette LH tube (with orange cap) from Reflotron-4 Kit

13. Remove inner tube from holder
    Tear off small orange cap, put it on tube bottom
    Insert inner tube into holder
    Secure tube on analyzer

14. Retrieve from Reflotron-4 Kit:
    bactericidal band-aid
    bactericidal tissue
    dry wipe
    Secure them on analyzer

15. Clean finger tip to be punctured (ring or middle) carefully with bactericidal tissue
    Allow alcohol on finger to dry

16. Take perforator in hand
    Firmly press subject's finger tip to orange platform to activate perforator trigger mechanism
    Secure perforator on analyzer

17. If finger needs to be punctured again:
    ↓ on perforator until lancet needle appears (turn away from eyes)
    Recap lancet
    ↓ on perforator to stop
    Remove lancet and discard
    Repeat steps 11, 14-16 p. 3-80

18. Squeeze out a drop of blood
    Blot it off with a dry wipe
    Squeeze out another drop of blood

19. Take pipette
↓ on pipette until some resistance can be felt (first ring mark should be aligned with the edge of yellow ring)
Draw blood into tip by releasing pipette pushbutton slowly and avoiding formation of air bubbles

NOTE

If air gets in the tip of the pipette, release tip content on the finger and repeat sample collection

20. Squeeze blood into tube (closer to thin, bottom part of tube):
↓ on pipette until it reaches second ring mark

21. Repeat steps 19, 20 until tube is full

22. Cap tube
Shake tube (thoroughly) to mix anti-coagulant with blood
Secure tube on analyzer

23. Measure hemoglobin HB:
Draw blood into pipette tip per step 19
Apply blood sample on measuring strip for hemoglobin HB
Perform measurements per steps 27-37 p. 3-82 - 3-84

24. Secure pipette on analyzer

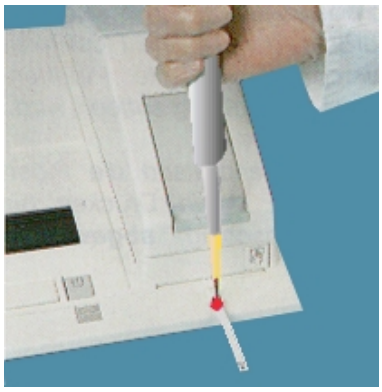
25. Treat puncture site with bactericidal tissue secured on analyzer see step 15 p. 3-80
Discard tissue into waste bag
Apply bactericidal band-aid to puncture site

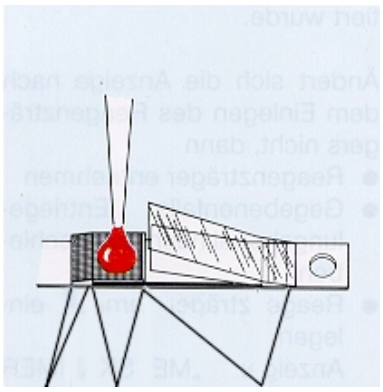
26. Uncap tube
Take pipette
↓ on pipette until some resistance can be felt (first ring mark should be aligned with the edge of yellow ring)
Draw blood into tip by releasing pipette pushbutton slowly and avoiding formation of air bubbles

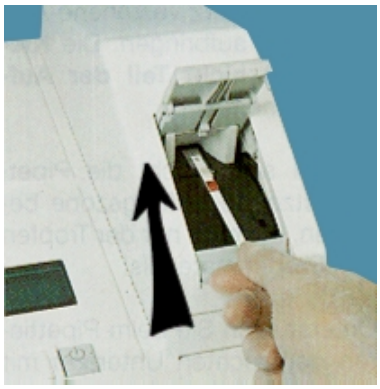
NOTE

Perform step 27 p. 3-82 for not more than 10 sec

27. Apply blood sample on measuring strip red area by pressing on pipette pushbutton until it reaches second ring mark
Open flap by depressing pb labeled FLAP
Insert strip into chamber to click (making sure pb П on transporter moves to the lower position)







28. ◅ message on screen:

ДД.ММ.ГГ ЧЧ:ММ:СС
ЗАКРОЙТЕ ДВЕРЦУ

29. Close FLAP

30. ◅ message on screen:

ДД.ММ.ГГ ЧЧ:ММ:СС ЧТЕНИЕ МАГНИТНОГО КОДА

NOTE

1. Parameter encoding matches marking on canisters with strips and on strips
2. Symbols *** indicate required measuring time

31. ◅ (after 4 - 5 sec) readout displays for measured parameter and time required for measurement, for example:

ДД.ММ.ГГ ЧЧ:ММ:СС GLU РЕЗ ЧЕРЕЗ*** СЕК

32. ◅ measurement results on display (appear upon completion of measurement process), for example:

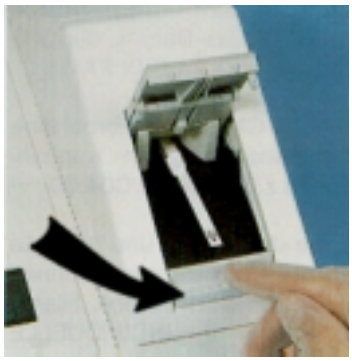
ДД.ММ.ГГ ЧЧ:ММ:СС GLU 5.12 mmol/l

NOTE

Appearance of > (greater than) and < (less than) signs signifies that value of measured parameter lies outside measurement range of instrument

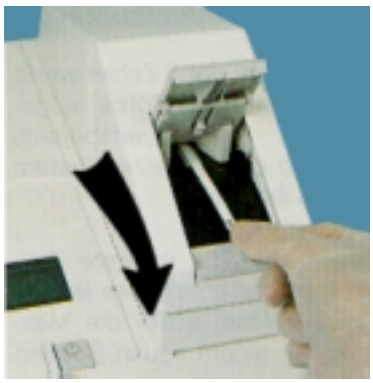
33. Record obtained results in Table 3.6 p. 3-92

34. Open flap by pressing pb labeled FLAP



35. While holding end of measuring strip, set switch Π to upper position

36. Remove measuring strip from measuring chamber



37. Discard measuring strip into waste bag
Close FLAP

38. To measure other parameters, repeat steps 3-6 p. 3-78, 3-79 and steps 26-37 p. 3-81 - 3-84

39. ↓ on perforator until lancet needle appears (turn away from eyes)
Recap lancet
↓ on perforator to stop and remove lancet
Discard lancet and orange platform into waste bag

40. Remove tip from pipette by pressing pushbutton up to stop
Discard into waste bag
Discard tube into waste bag

3.11.3. ONE-PARAMETER-TEST OPERATION

1. Perform Sect. 3.11.2 steps. 1-11, 14-19, 25, 27-37 pp. 3-78 - 3-84

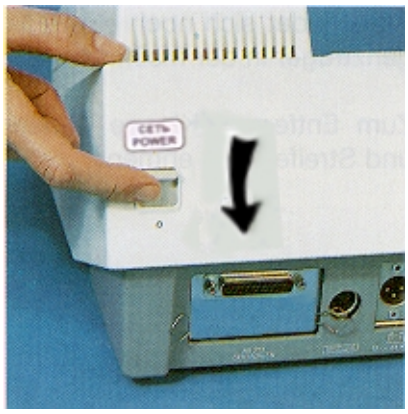
2. ↓ on perforator until lancet needle appears (turn away from eyes)
   Recap lancet
   ↓ on perforator to stop and remove lancet
   Discard lancet and orange platform into waste bag

3. Remove tip from pipette by pressing pushbutton up to stop
   Discard into waste bag

3.11.4. CLOSEOUT OPERATIONS

1. √ FLAP is closed

2. sw POWER → 0
   ■ LED (green) on the analyzer front panel



3. РБС-10/3
   connector X2 ←|→ connector X2 РБС-10/3
   connector X1 ←|→ connector X1 on the analyzer back panel

4. Stow in Reflotron-4 Accessories Kit case:
   perforator
   power cable
   pipette

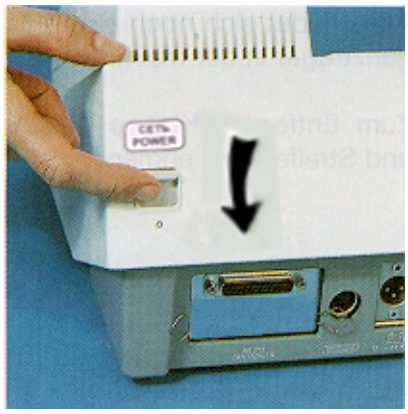
5. Secure Accessories Kit on analyzer
   Stow:
   analyzer
   Reflotron-4 Kit
   canisters with Reflotron-4 measuring strips
   Discard waste bag

3.11.5. MEASURING CHAMBER CLEANUP

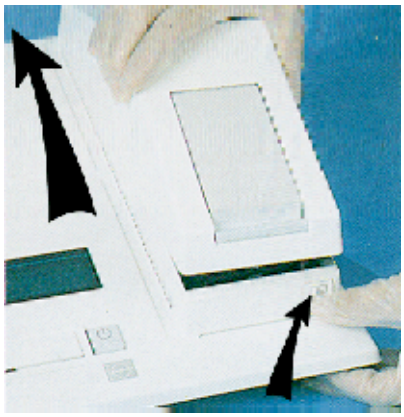
1. If display is showing □:

ДД.ММ.ГГ ЧЧ:ММ:СС ОЧИСТКА И ПРОВЕРКА

2. sw POWER → 0
   ■ LED (green) on analyzer front panel

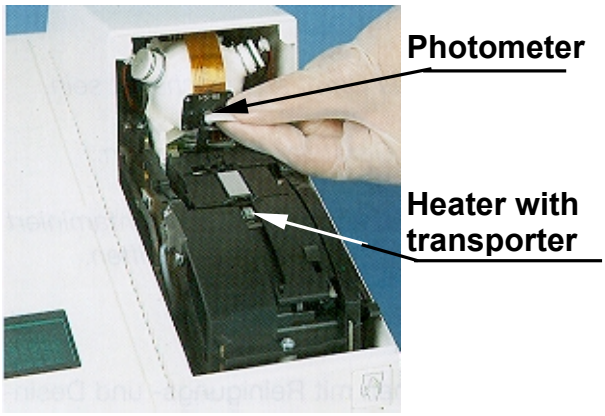


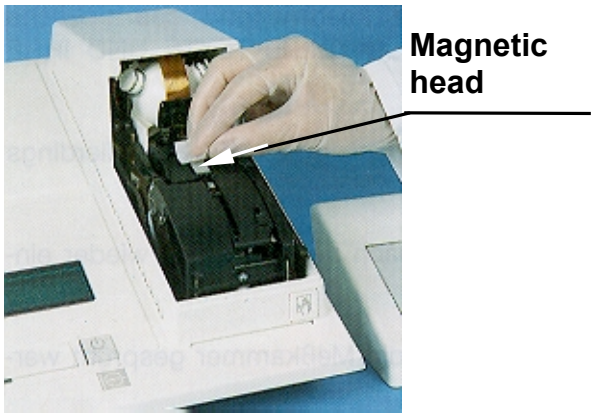
3. Remove measuring chamber lid by pressing pb labeled LID



4. Retrieve a tissue from Reflotron-4 Kit
   Discard packaging into waste bag

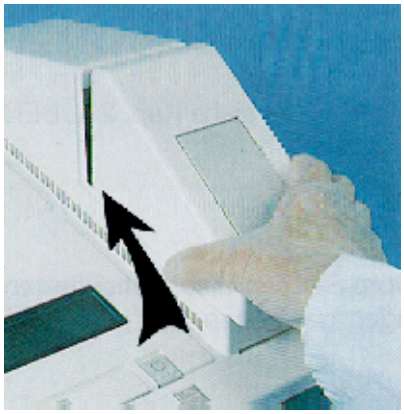
5. Wipe with single tissue:
   photometer
   magnetic head
   heater with transporter
   Discard tissue into waste bag





6. Let analyzer dry for 15 min

7. Reinstall measuring chamber lid until it clicks in place



8. Repeat analyzer functional check using calibration strip CHEK per Sect. 3.11.1.1 p. 3-75

3.11.6. LIST OF READOUT MESSAGES AND TROUBLESHOOTING

Message	Meaning of Message	Crew member actions
20.09.96 12.09.56 **REFLOTRON MXX.XX.CXX.XX**	Check of analyzer's functionality	Not required
20.09.96 12.09.56 **ЖДИТЕ ПРОГРЕВ 180 сек**	Time required for analyzer to warm up	Allow analyzer to warm up
20.09.96 12.09.56 **ГОТОВ К РАБОТЕ**	Analyzer is ready to operate	Start blood test
20.09.96 12.09.56 **ВСТАВЬТЕ ПОЛОСКУ**	FLAP is open	Insert measuring strip
20.09.96 12.09.56 **ЗАКРОЙТЕ ДВЕРЦУ**	Measuring strip is inserted correctly but cover latch is in wrong position	Close measuring chamber cover
20.09.96 12.09.56 **ЧТЕНИЕ МАГНИТНОГО КОДА**	Magnetic code is being read	Not required
20.09.96 12.09.56 **GLU РЕЗ. ЧЕРЕЗ 143 СЕК**	Magnetic code has been read correctly	Wait for result
20.09.96 12.09.56 **GLU 5.12 mmo/l**	Result of measurement	Record result
20.09.96 12.09.56 **GLU < 0.56 mmol/l**	The result is off-scale low	Repeat measurement
20.09.96 12.09.56 **GLU > 33.3 mmol/l**	The result is off-scale high	Repeat measurement
20.09.96 12.09.56 **GGT 31.0 U/l 37°C**	Result for enzymes, temperature is also specified	Record result
20.09.96 12.09.56 **GGT 200 U/l 37°C** ⇓ **20.09.96 12.09.56** **НЕЛИНЕЙНАЯ РЕАКЦИЯ!**	Nature of kinetic reaction is somewhat different from linear	Repeat measurement strictly following recommended procedure

Message	Meaning of the message	Crew member actions
20.09.96 12.09.56 **НЕВЕРНЫЙ РЕЗУЛЬТАТ!** ⇓ **20.09.96 12.09.56** **НЕЛИНЕЙНАЯ РЕАКЦИЯ!**	Nature of kinetic reaction is significantly different from linear	Repeat measurement strictly following recommended procedure
20.09.96 12.09.56 **GGT 200 U/l 37°C** ⇓ **20.09.96 12.09.56** **ПАРАМЕТР ВНЕ ПРЕДЕЛА!**	Kinetic reaction linearity can not be checked	Repeat measurement strictly following recommended procedure
NO PARAMETER	Unit of measurement or temperature cannot be determined because strip to be measured is not present	Insert strip
НЕТ ДАННЫХ!	No more records in buffer	Proceed after ГОТОВ К РАБОТЕ (ready to operate) message appears
20.09.96 12.09.56 **УДАЛИТЕ ПОЛОСКУ**	Used measuring strip was left in chamber	Remove used measuring strip
20.09.96 12.09.56 **НЕТ МАГНИТНОГО КОДА!**	After chamber was closed, analyzer could not read magnetic code	Insert measuring strip with magnetic layer facing downward, red field first
20.09.96 12.09.56 **НЕВЕРНО СЧИТАН МАГ. КОД!**	Magnetic code is incomplete or damaged	Replace measuring strip
20.09.96 12.09.56 **ИЗМЕРЕНИЕ ПРЕРВАНО!** *After* **20.09.96 12.09.56** **ЗАКРОЙТЕ ДВЕРЦУ**	The measurement is halted because the chamber has been opened during measurement	Close chamber and wait for next message
20.09.96 12.09.56 **ИЗМЕРЕНИЕ ПРЕРВАНО!** *After* **20.09.96 12.09.56** **УДАЛИТЕ ПОЛОСКУ**	The measurement is halted because the chamber has been opened during measurement	Open chamber and remove measuring strip

Message	Meaning of the message	Crew member actions
20.09.96 12.09.56 ОЧИСТКА И ПРОВЕРКА!	Measuring chamber needs to be cleaned	Clean the chamber (see Sect. 3.11.5 p. 3-86)
20.09.96 12.09.56 ВСТАВЬТЕ CHECK ПОЛОСКУ!	More than 7 days have passed or more than 100 measurements have been performed since latest analyzer functional check	Check functionality of analyzer using CHECK measuring strip (see Sect. 3.11.1.1 p. 3-75)
ПРИБОРУ ЖАРКО!	Temperature outside measuring chamber is too high	Inspect analyzer's vent screen and measure ambient temperature Relocate the device to a cooler location Before resuming operation, cool down analyzer
ПРИБОРУ ХОЛОДНО!	Temperature outside measuring chamber is too low	Transfer analyzer to a warmer location (15 – 32^{O}C) Before resuming operation, warm up analyzer
ERROR DDDD	Problem can only be eliminated by expert	Power cycle analyzer If message persists, **report to MCC**
Не горит зеленый СвД питания	Power is off	Check power cable connections

For notes

Table 3.6 Results of biochemical parameters analysis (Reflotron-4)

NAME							
Date							
GLU							
HB							
CHOL							
TG							
UREA							
GGT							
UA							
GOT							
GPT							
BIL							
AMYL							
CREA							
CK							
P - AM							
HDLP							

NAME							
Date							
GLU							
HB							
CHOL							
TG							
UREA							
GGT							
UA							
GOT							
GPT							
BIL							
AMYL							
CREA							
CK							
P - AM							
HDLP							

Table 3.6 (continued)

NAME							
Date							
GLU							
HB							
CHOL							
TG							
UREA							
GGT							
UA							
GOT							
GPT							
BIL							
AMYL							
CREA							
CK							
P - AM							
HDLP							

NAME							
Date							
GLU							
HB							
CHOL							
TG							
UREA							
GGT							
UA							
GOT							
GPT							
BIL							
AMYL							
CREA							
CK							
P - AM							
HDLP							

For notes

4. CONTROL OF ENVIRONMENT

4.1. MO-21 CONTROL OF ENVIRONMENT MICROECOSPHERA

Hardware:

ЭКОСФЕРА (Ecosphera)Sampler Kit:
- Air sampler
- Charging unit
- БП ЭКОСФЕРА (Ecosphera power supply unit - battery)
- Tray for Petri dish storage
- Ecosphera cable (Хт.6.644.605)

(CENTER) POWER UNIT (ЦЕНТР МЭК-2 Kit)

Ecosphera kit:
- Petri dishes with MEDIA 1 (8 ea. + 2 spares)
- Petri dishes with MEDIA 2 (8 ea. + 2 spares)

Experiment Timeline:

Day of experiment	Crew members' actions	Time spent by crew
	Charging of Ecosphera battery (charge time ~ 8 hours)	20 min
	Installation of KRIOGEM-03 refrigerator (if necessary), see MO Book 1 Sect. 7.1.1 p. 7-4	20 min
1 hour prior to sample collection	Activation of KRIOGEM-03 refrigerator in mode +37°C, see MO Book 1 Sect. 7.1.3 p. 7-5	
T.0	Microflora sample collection and sample with MEDIA 1 placement for incubation in refrigerator	50 min
T.0 + 2 days	Evaluation of test results of bacteria microflora in Petri dishes for MEDIA 1	40 min
T.0 + 7 days	Evaluation of test results of fungus in Petri dishes for MEDIA 2	40 min

4.1.1. SETUP

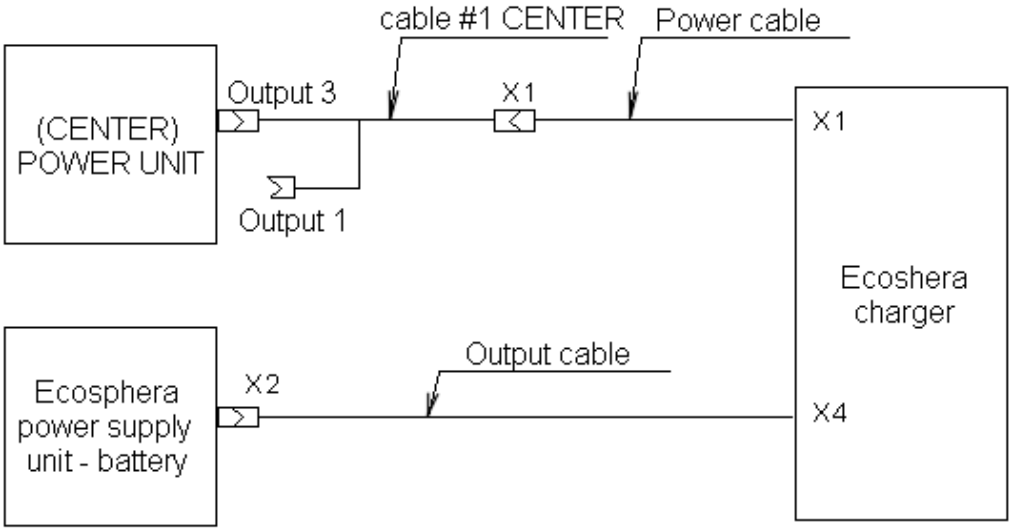
4.1.1.1. CHARGING БП ЭКОСФЕРА (ECOSPHERA BATTERY)

NOTE

Charging time is 8 hours

1. Unstow:
   ЦЕНТР МЭК-2 kit with cables
   ЭКОСФЕРА sampler set
   Retrieve cable # 1 ЦЕНТР from ЦЕНТР МЭК-2 kit

2. Assemble circuit to charge БП ЭКОСФЕРА battery



(CENTER) POWER UNIT
(CENTER) CONNECOR CHECK

3. sw VOLTAGE → 9
   sw CHECK → 5…20
   sw CHECK → POWER UNIT
   sw V – Ω → V

ППС-24
(CENTER) POWER UNIT
(CENTER) CONNECOR CHECK
Ecospera charger

4. ⏻ <CENTER> MED SYS
   ⏻ PANEL PWR □ LED green
   ⏻ PANEL PWR
   □ LED (red)

(CENTER) POWER UNIT
Ecospera charger
(CENTER) CONNECOR CHECK

5. After charging is complete (in 8 hours):
   ⏼ PANEL PWR
   ■ LED (red)
   ⏼ PANEL PWR

ППС-24

⏼ <CENTER> MED SYS

6. Disassemble configuration and restow hardware

4.1.2. TEST PERFORMANCE

4.1.2.1. HARDWARE ACTIVATION

NOTE

1. Air sampling is performed by one operator in discretionary order
2. Sampling locations are specified in Table on case cover, or per **MCC** instruction

1. Unstow ЭКОСФЕРА Sampler Kit

2. Remove from the kit:
   Air sampler
   БП ЭКОСФЕРА battery
   Ecosphera cable

3. Secure БП ЭКОСФЕРА battery to air sampler body using Velcro

4. cnctr X3 of Ecosphera cable →|← connector X3 on air sampler
   cnctr X2 of Ecosphera cable →|← connector X2 on БП ЭКОСФЕРА battery

5. Remove plastic cover from nozzle screen
   Stow nozzle screen in ЭКОСФЕРА Sampler Kit

6. Configure controls on air sampler back panel as follows:
   ⏻ ВКЛ (On) □ LED (under the switch)
   sw РАСХОД → 1

7. Place air sampler in left hand, put strap over hand

8. Hold sampler with nozzle screen facing away

00:00:00 9. ↓ pb ПУСК (on control panel)
   👂 motor is running

00:00:20 10. 👂 motor stops
   ⏻ ВЫКЛ (Off) ■ LED (under the switch)

4.1.2.2. MICROFLORA SAMPLE COLLECTION

CAUTION
1. If mold and bacteria are detected on surfaces, perform sample collection in this area in addition to scheduled area Report new air sample collection area to **MCC**
2. When performing sample collection, do not touch media surface with fingers

1. sw РАСХОД → 3 (on control panel)

2. Unstow ЭКОСФЕРА Kit

3. Take ЭКОСФЕРА Kit and air sampler to first sample collection area

4. Unscrew ↶ nozzle screen
   Secure nozzle screen to sampler body using Velcro

5. Remove Petri dish with MEDIA 1 from ЭКОСФЕРА Kit

CAUTION

Petri dish number should match sampling location number

OPERATION A:

6. Open package
   Retrieve Petri dish
   Discard package
   Write sample collection location on the lid (if necessary)

7. Place Petri dish on base of sampler collection element with lid facing outside

8. Remove lid from Petri dish
   Place lid in suit pocket

9. Attach nozzle screen to base of sample collection element by turning ↷
   Hold sampler at chest level with nozzle screen facing away

10. ↓ pb ПУСК (on control panel) □ LED (under the switch)

    Motor is operating

11. (~60 sec) motor stops

12. **After motor stops:**
    Rotate ↶ nozzle screen
    Remove nozzle screen and secure it to sampler body with Velcro
    Place lid on contact plate of Petri dish
    Detach Petri dish from the base of sample collection element
    Stow Petri dish back in ЭКОСФЕРА Kit

13. Remove Petri dish with MEDIA 2 from ЭКОСФЕРА Kit
    Repeat operation A with Petri dish with MEDIA 2, do not discard Petri dish packages and later on use them for stowage of Petri dishes with samples

14. After completion of sample collection in one area, go to another sampling location
    In each location, perform sample collection to corresponding Petri dishes with MEDIA 1 and MEDIA 2

4.1.2.3. CLOSEOUT OPERATIONS

After concluding sample collection in last sampling location, perform closeout steps:

1. ВЫКЛ (on control panel) ■ LED (under the switch)
2. Disassemble circuit and stow cable
3. Detach БП ЭКОСФЕРА battery from sampler
4. Attach plastic cover to sampler nozzle screen
5. Attach nozzle screen to base of sample collection element by turning
6. Place in ЭКОСФЕРА sampler kit:
   БП ЭКОСФЕРА battery
   Ecosphera cable
   Air sampler
7. Place Petri dishes with samples collected with MEDIA 1 into cassette
8. Place cassette in KRIOGEM-03 refrigerator (for 48 hrs at +37°C) or place cassette in warmer place per crew discretion
9. Place Petri dishes with collected samples with MEDIA 2 into Ecosphera kit for 7 days (stowed at ambient temperature)
10. Stow sampler kit

4.1.2.4. EVALUATION OF TEST RESULTS

Microorganisms settled from air onto media will produce growth of various colonies
Number of colonies indicates air contamination level
The results are interpreted by the operator, if necessary, they may be videotaped and downlinked to **MCC**
When videotaping, view Petri dishes through bottom against light and then under the same light source in reflected light

NOTE

1. In Petri dishes with MEDIA 1, grown colony count is performed 2 days after sample collection
2. In Petri dishes with MEDIA 2, grown colony count is performed 7 days after sample collection

4.1.2.5. TOTAL COLONY COUNT

NOTE

Perform colony count at the table near a light source

1. Remove Petri dish with collected samples from cassette
2. Place Petri dish 20-30 cm away from eye level
3. Without opening lid, view Petri dish against light through the bottom (of contact plate)
4. Without opening lid, view Petri dish in reflected light from lid side
5. Count and classify colonies by type (to simplify counting, each colony can be marked with felt-tip pen)
6. Record obtained results in Table 4.1 p. 4-10
7. Repeat counting and classification of colonies of microorganisms for all Petri dishes
8. **When results logging is complete:**
   Discard Petri dishes
   Stow cassette in ЭКОСФЕРА Sampler Kit

4.1.2.6. COLONY CLASSIFICATION IN PETRI DISHES WITH MEDIA 1

Resulting colonies may be of different types:

Sporoformic bacillus:
large (3-6 mm and larger), irregular-form colonies, appear as a membrane with uneven, wrinkled or vesicular surface, gray or yellowish in color (see Figure 4.1 p. 4-13)

Coryneformic bacteria:
Small (to 1 mm), flat, gray matte colonies (see Figure 4.2 p. 4-14)

Gram-negative bacteria:
Medium size (1-3 mm), round, protruding, slimy or watery colonies
Have smooth shiny surface, whitish-gray or yellowish color (see Figure 4.3 p. 4-14)

4.1.2.7. COLONY CLASSIFICATION IN PETRI DISHES WITH MEDIUM 2

Resulting colonies may be of different types:

Dark-colored fungi may have the following color:
Brownish-red, dark-olive, dark ashen, green-black and black (see Figure 4.4 p. 4-15, Figure 4.5 p. 4-16)

Light-colored fungi may have the following color:
Gray, grayish-green, green, bluish, yellow, brown-pink, orange-pink and orange-red (see Figure 4.6 - Figure 4.12 p. 4-17 - 4-23)

4.1.2.8. DOWNLINK INFORMATION

The operator reports the test results during comm pass in the following format:
ID# of sampling location
Number of microorganisms /fungi/ in sample in the same order as recorded in corresponding columns of Table 4.1 p. 4-10

Example of reported data:
3 А25, 3 Б0, 3 В15, 3 Г10, 3 Д20, 3 Е15, 3 Ж5

If the data is videotaped, it needs to be downlinked to **MCC**

For notes

Table 4.1 **RECORD OF TEST RESULTS**

	MEDIA 1				**MEDIA 2**		
Microflora sampling locations	Total number of microor-ganisms in sample	Number of sporoformic bacilli	Number of gram-negative bacilli	Number of coryne-formic bacteria	Total number of fungi	Number of light-colored fungi	Number of dark-colored fungi
	А	**Б**	**В**	**Г**	**Д**	**Е**	**Ж**
Location #1							
Location # 2							
Location # 3							
Location #4							
Location # 5							
Location # 6							

Table 4.1 **RECORD OF TEST RESULTS**

	MEDIA 1				**MEDIA 2**		
Microflora sampling locations	Total number of microor-ganisms in sample	Number of sporoformic bacilli	Number of gram-negative bacilli	Number of coryne-formic bacteria	Total number of fungi	Number of light-colored fungi	Number of dark-colored fungi
	А	**Б**	**В**	**Г**	**Д**	**Е**	**Ж**
Location #1							
Location # 2							
Location # 3							
Location #4							
Location # 5							
Location # 6							

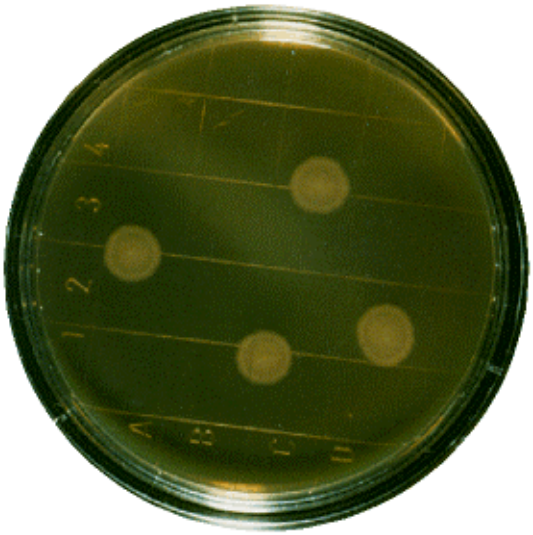
Table 4.1 **RECORD OF TEST RESULTS**

	MEDIA 1				**MEDIA 2**		
Microflora sampling locations	Total number of microor-ganisms in sample	Number of sporoformic bacilli	Number of gram-negative bacilli	Number of coryne-formic bacteria	Total number of fungi	Number of light-colored fungi	Number of dark-colored fungi
	А	**Б**	**В**	**Г**	**Д**	**Е**	**Ж**
Location #1							
Location # 2							
Location # 3							
Location #4							
Location # 5							
Location # 6							

Table 4.1 **RECORD OF TEST RESULTS**

	MEDIA 1				**MEDIA 2**		
Microflora sampling locations	Total number of microor-ganisms in sample	Number of sporoformic bacilli	Number of gram-negative bacilli	Number of coryne-formic bacteria	Total number of fungi	Number of light-colored fungi	Number of dark-colored fungi
	А	**Б**	**В**	**Г**	**Д**	**Е**	**Ж**
Location #1							
Location # 2							
Location # 3							
Location #4							
Location # 5							
Location # 6							

For notes



TYPE A

TYPE Б

Figure 4.1. Sporoformic bacillus

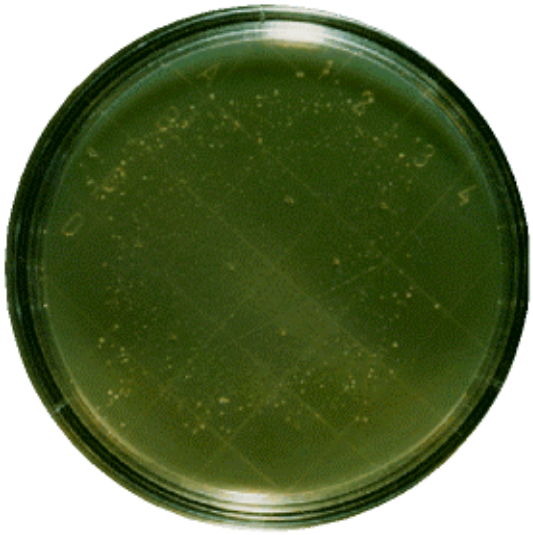


Figure 4.2. Coryneformic bacteria

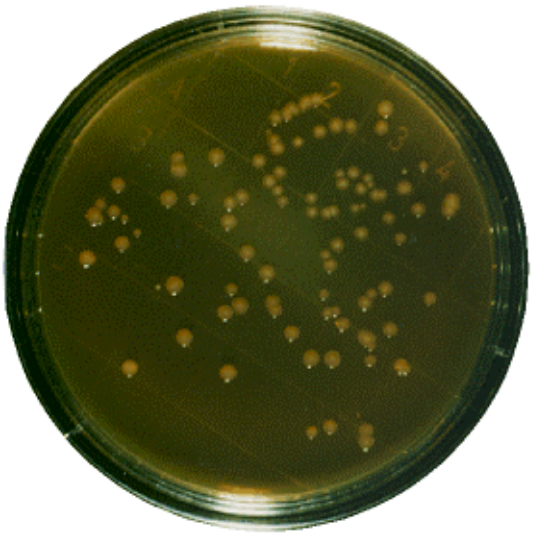
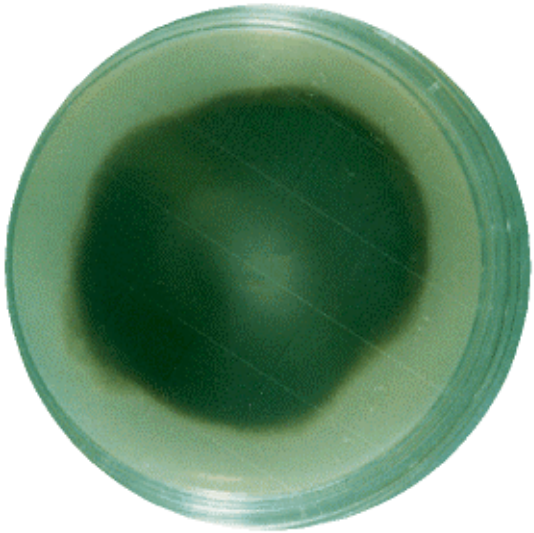


Figure 4.3. Gram-negative bacteria

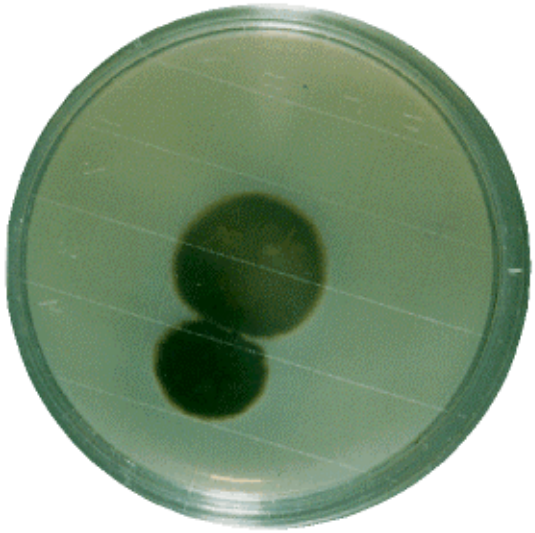
TYPE A (as viewed through lid)



TYPE A (as viewed through bottom)

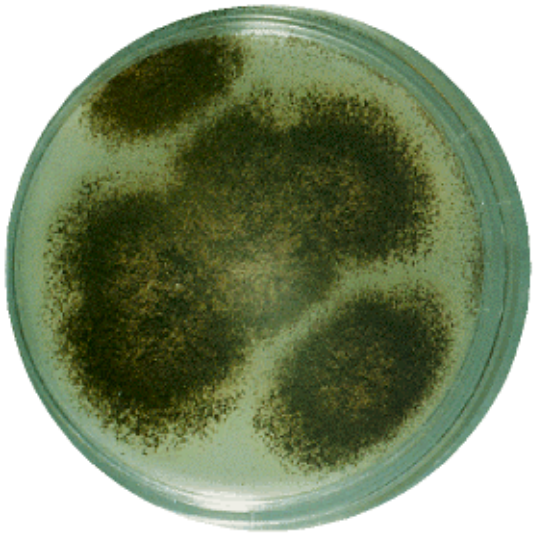
Figure 4.4 Dark-colored fungi

TYPE Б (as viewed through lid)



TYPE Б (as viewed through bottom)

Figure 4.5 Dark-colored fungi

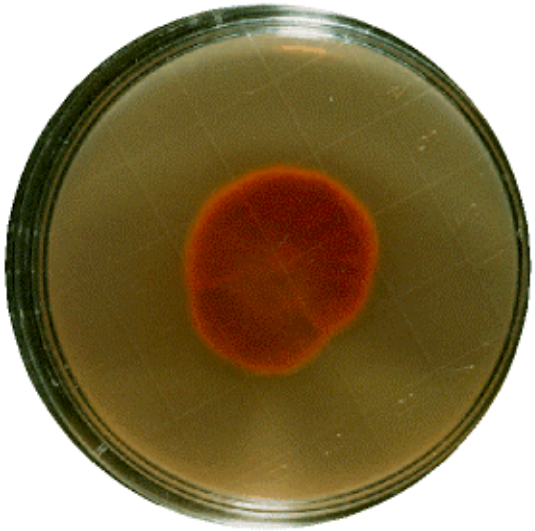


TYPE A (as viewed through lid)

TYPE A (as viewed through bottom)

Figure 4.6 Light-colored fungi

TYPE Б (as viewed through lid)



TYPE Б (as viewed through bottom)

Figure 4.7 Light-colored fungi

TYPE B (as viewed through lid)

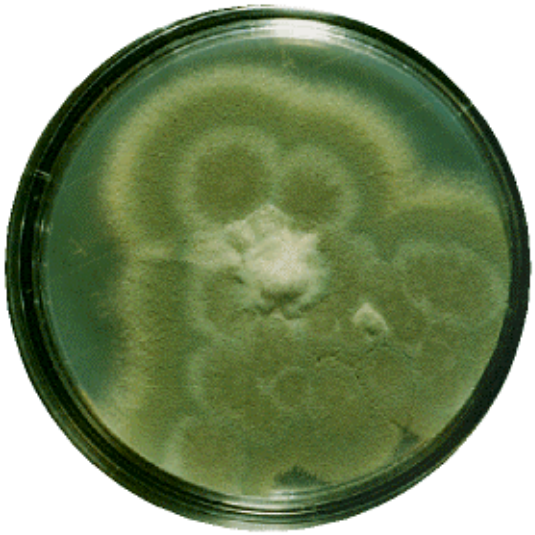
ТИП В (as viewed through bottom)

Figure 4.8 Light-colored fungi

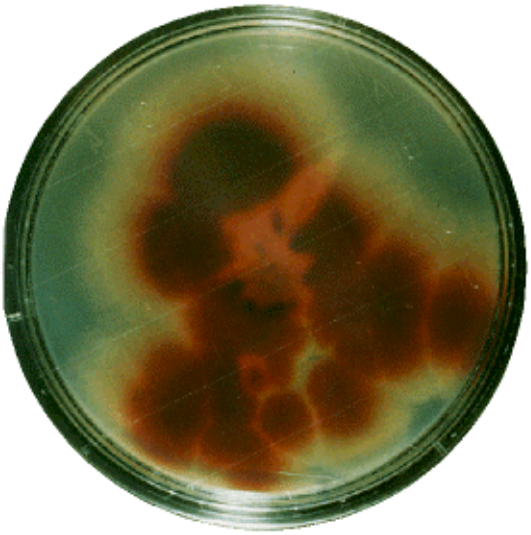
TYPE Γ (as viewed through lid)

TYPE Γ (as viewed through bottom)

Figure 4.9 Light-colored fungi



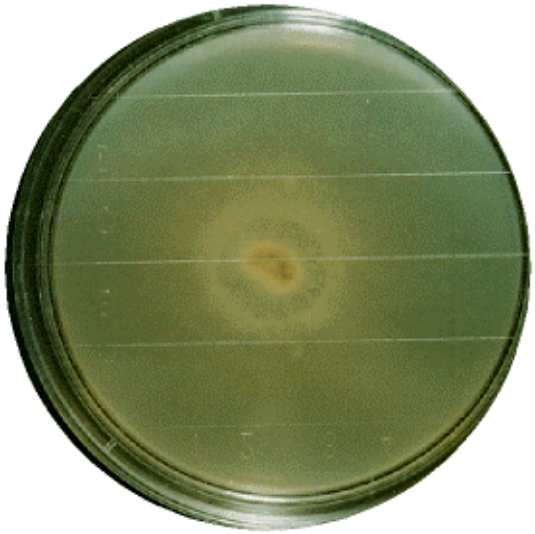
TYPE Д (as viewed through lid)



TYPE Д (as viewed through bottom)

Figure 4.10 Light-colored fungi

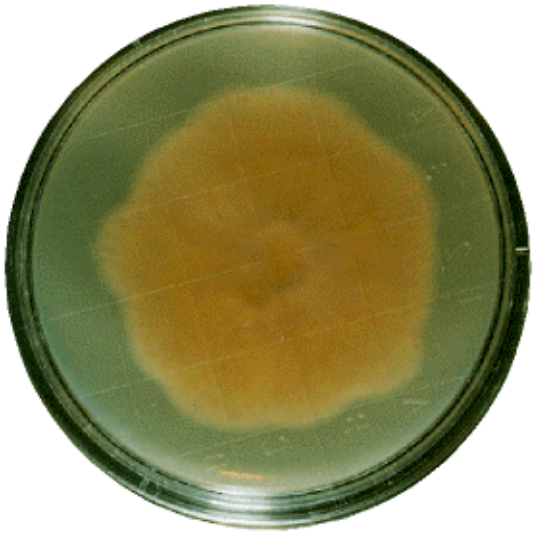
TYPE E (as viewed through lid)



TYPE E (as viewed through bottom)

Figure 4.11 Light-colored fungi

TYPE Ж (as viewed through lid)



TYPE Ж (as viewed through bottom)

Figure 4.12 Light-colored fungi

4.2. MO-22 SANITARY-EPIDEMIOLOGICAL STATUS MONITORING

Hardware:

Kit with test tubes (for hardware surfaces)
Kit with test tubes (for crew member)

CAUTION

When collecting samples, do not touch capillary tube walls and cotton swab with bare fingers in order to prevent sample contamination

1. Unscrew one tube lid and remove cotton swab from test tube
   Collect microflora sample (collection locations are indicated on kit pocket flap next to each test tube)

2. Insert lid with cotton swab into test tube
   Close lid firmly

3. Label crewmember's name on kit with test tubes

4. Stow test tubes with collected samples in relevant kit
   Stow kit

5. QUESTIONARY

5.1. PHS (30 DAY PHYSICAL EVALUATION)

NOTE

Steps 17, 23, 24, 31 are performed per clinical indications

Clinical Evaluation:

Date								
Time								
Crewmember's ID								
Examiner's ID								
1	**Blood Pressure**							
2	**Pulse**							
3	**Respiratory Rate**							
4	**Body temperature (Celsius)**							
5	**Peak Flow**							
6	**Medications Taken**							
	No	1						
	Yes (report FS via PMC)	2						
7	**Complaints**							
	No	1						
	Yes (report FS via PMC)	2						
8	**Sleep Duration (hours)**							
9	**Quality of Sleep**							
	Normal Deep (sound), uninterrupted	1						
	Interrupted	2						
	Insomnia	3						
10	**Fatigue**							
	Absent	1						
	Occurs at end of day, relieved with sleep	2						
	Not relieved with sleep	3						

11	**Appetite**							
	Normal	1						
	Increased	2						
	Decreased	3						
	Absent	4						
12	**Water/Liquid Consumption**							
	Normal (usual)	1						
	Increased	2						
	Decreased	3						
	Absent	4						
13	**Nose**							
	Normal	1						
	Congestion	2						
	Discharge	3						
	Bleeding	4						
14	**Mouth and Throat**							
	Normal	1						
	Swelling	2						
	Redness	3						
	Changes in Tonsils	4						
15	**Dental/Gums**							
	Normal	1						
	Tenderness	2						
	Swelling	3						
	Redness	4						
	Cracked/Loose Teeth	5						
16	**Ears-General**							
	Normal	1						
	Drainage	2						
	Redness	3						
	Wax Buildup	4						

17	**Ears-Tympanic Membrane**							
	Normal	1						
	Redness	2						
	Deformation	3						
	Perforated	4						
	Fluid	5						
	Bloody	6						
	No movement w/Valsalva	7						
18	**Eyes-Lids**							
	Normal	1						
	Redness	2						
	Swelling	3						
	Lesion	4						
	Droopy Eyelid (Ptosis)	5						
	Crusting	6						
	Swelling around eyes (Periorbital Edema)	7						
	Itch	8						
19	**Eyes- Conjunctiva**							
	Normal	1						
	Redness	2						
	Hemorrhage	3						
	Tearing	4						
	Dryness	5						
20	**Eyes-Cornea**							
	Normal	1						
	Scar	2						
	Cloudy	3						
21	**Eyes-Pupils**							
	Normal	1						
	Dilated	2						
	Constricted	3						
	Unequal size	4						
	Unreactive to light	5						

22	**Eyes-Ocular Motility**							
	Normal	1						
	Nystagmus	2						
	Asymmetry	3						
23	**Eyes-Opthalmoscopic/Retina**							
	Normal	1						
	Hemorrhage	2						
	Other lesions	3						
24	**Eyes-IOP**							
25	**Neck**							
	Normal	1						
	Enlarged lymph nodes	2						
	Enlarged veins	3						
26	**Chest**							
	Normal	1						
	Asymmetric appearance	2						
	Asymmetric movement	3						
	Shallowing breathing	4						
	Deep breathing	5						
27	**Lungs**							
	Normal	1						
	Coarse breath sounds	2						
	Decreased/Weak Respiration	3						
	Crackles	4						
	Wheezing	5						
	Rales (fluid sounds)	6						
28	**Heart**							
	Normal	1						
	Murmur	2						
	Irregular	3						
29	**Vascular System-Pulse**							
	Normal	1						
	Weak	2						
	Intense	3						
	Irregular	4						
	Asymmetric	5						

30	**Abdomen**							
	Normal	1						
	Bowel Sounds (Peristalsis) Increased	2						
	Bowel Sounds (Peristalsis) Decreased	3						
	Pain on palpation	4						
	Rigid abdomen	5						
	Mass	6						
31	**Genito-Urinary**							
	Normal	1						
	Discharge	2						
	Tenderness	3						
32	**Upper Extremities**							
	Normal	1						
	Asymmetric Strength	2						
	Altered ROM	3						
	Tenderness	4						
	Swelling	5						
	Redness	6						
	Bruising	7						
	Lesions	8						
33	**Lower Extremities**							
	Normal	1						
	Asymmetric Strength	2						
	Altered ROM	3						
	Tenderness	4						
	Swelling	5						
	Redness	6						
	Bruising	7						
	Lesions	8						
34	**Spine/Musculoskeletal**							
	Normal	1						
	Decreased ROM	2						
	Pain on palpation of spine	3						

35	**Skin, Lymphatic**							
	Normal	1						
	Redness	2						
	Pale	3						
	Rash	4						
	Itch	5						
	Abrasions	6						
	Lacerations	7						
	Bruising	8						
	Burns	9						
	Skin infection	10						
	Enlarged nodes	11						
	Tender nodes	12						
36	**Neuromuscular Exam** **Finger to Nose test**							
	Normal	1						
	Miss	2						

NOTE.

Steps 17, 23, 24, 31 are performed per clinical indications

Clinical Evaluation:

Date								
Time								
Crewmember's ID								
Examiner's ID								
1	**Blood Pressure**							
2	**Pulse**							
3	**Respiratory Rate**							
4	**Body temperature (Celsius)**							
5	**Peak Flow**							
6	**Medications Taken**							
	No	1						
	Yes (report FS via PMC)	2						
7	**Complaints**							
	No	1						
	Yes (report FS via PMC)	2						
8	**Sleep Duration (hours)**							
9	**Quality of Sleep**							
	Normal Deep (sound), uninterrupted	1						
	Interrupted	2						
	Insomnia	3						
10	**Fatigue**							
	Absent	1						
	Occurs at end of day, relieved with sleep	2						
	Not relieved with sleep	3						

11	**Appetite**							
	Normal	1						
	Increased	2						
	Decreased	3						
	Absent	4						
12	**Water/Liquid Consumption**							
	Normal (usual)	1						
	Increased	2						
	Decreased	3						
	Absent	4						
13	**Nose**							
	Normal	1						
	Congestion	2						
	Discharge	3						
	Bleeding	4						
14	**Mouth and Throat**							
	Normal	1						
	Swelling	2						
	Redness	3						
	Changes in Tonsils	4						
15	**Dental/Gums**							
	Normal	1						
	Tenderness	2						
	Swelling	3						
	Redness	4						
	Cracked/Loose Teeth	5						
16	**Ears-General**							
	Normal	1						
	Drainage	2						
	Redness	3						
	Wax Buildup	4						

17	**Ears-Tympanic Membrane**							
	Normal	1						
	Redness	2						
	Deformation	3						
	Perforated	4						
	Fluid	5						
	Bloody	6						
	No movement w/Valsalva	7						
18	**Eyes-Lids**							
	Normal	1						
	Redness	2						
	Swelling	3						
	Lesion	4						
	Droopy Eyelid (Ptosis)	5						
	Crusting	6						
	Swelling around eyes (Periorbital Edema)	7						
	Itch	8						
19	**Eyes- Conjunctiva**							
	Normal	1						
	Redness	2						
	Hemorrhage	3						
	Tearing	4						
	Dryness	5						
20	**Eyes-Cornea**							
	Normal	1						
	Scar	2						
	Cloudy	3						
21	**Eyes-Pupils**							
	Normal	1						
	Dilated	2						
	Constricted	3						
	Unequal size	4						
	Unreactive to light	5						

22	**Eyes-Ocular Motility**							
	Normal	1						
	Nystagmus	2						
	Asymmetry	3						
23	**Eyes-Opthalmoscopic/Retina**							
	Normal	1						
	Hemorrhage	2						
	Other lesions	3						
24	**Eyes-IOP**							
25	**Neck**							
	Normal	1						
	Enlarged lymph nodes	2						
	Enlarged veins	3						
26	**Chest**							
	Normal	1						
	Asymmetric appearance	2						
	Asymmetric movement	3						
	Shallowing breathing	4						
	Deep breathing	5						
27	**Lungs**							
	Normal	1						
	Coarse breath sounds	2						
	Decreased/Weak Respiration	3						
	Crackles	4						
	Wheezing	5						
	Rales (fluid sounds)	6						
28	**Heart**							
	Normal	1						
	Murmur	2						
	Irregular	3						
29	**Vascular System-Pulse**							
	Normal	1						
	Weak	2						
	Intense	3						
	Irregular	4						
	Asymmetric	5						

30	**Abdomen**							
	Normal	1						
	Bowel Sounds (Peristalsis) Increased	2						
	Bowel Sounds (Peristalsis) Decreased	3						
	Pain on palpation	4						
	Rigid abdomen	5						
	Mass	6						
31	**Genito-Urinary**							
	Normal	1						
	Discharge	2						
	Tenderness	3						
32	**Upper Extremities**							
	Normal	1						
	Asymmetric Strength	2						
	Altered ROM	3						
	Tenderness	4						
	Swelling	5						
	Redness	6						
	Bruising	7						
	Lesions	8						
33	**Lower Extremities**							
	Normal	1						
	Asymmetric Strength	2						
	Altered ROM	3						
	Tenderness	4						
	Swelling	5						
	Redness	6						
	Bruising	7						
	Lesions	8						
34	**Spine/Musculoskeletal**							
	Normal	1						
	Decreased ROM	2						
	Pain on palpation of spine	3						

35	**Skin, Lymphatic**							
	Normal	1						
	Redness	2						
	Pale	3						
	Rash	4						
	Itch	5						
	Abrasions	6						
	Lacerations	7						
	Bruising	8						
	Burns	9						
	Skin infection	10						
	Enlarged nodes	11						
	Tender nodes	12						
36	**Neuromuscular Exam** **Finger to Nose test**							
	Normal	1						
	Miss	2						

5.2. PRE-EVA EXAMS

PHS-pre-EVA-1 (Is conducted 1-2 days prior to EVA)

Date								
Time								
Crewmember's ID								
Examiner's ID								
1	**Blood Pressure**							
2	**Pulse**							
3	**Respiratory Rate**							
4	**Temperature Celsius**							
5	**Medications Taken**							
	No	1						
	Yes (report FS via PMC)	2						
6	**Complaints**							
	No	1						
	Yes (report FS via PMC)	2						
7	**Sleep Duration (hours)**							
8	**Quality of Sleep**							
	Normal Deep(sound), uninterrupted	1						
	Interrupted	2						
	Insomnia	3						
9	**Fatigue**							
	Absent	1						
	Occurs at end of day, relieved with sleep	2						
	Not relieved with sleep.	3						
10	**Nose**							
	Normal	1						
	Congestion	2						
	Discharge	3						
	Bleeding	4						
11	**Mouth and Throat**							
	Normal	1						
	Swelling	2						
	Redness	3						
	Changes in Tonsils	4						

12	**Ears-Tympanic Membrane**							
	Normal	1						
	Redness	2						
	Deformation	3						
	Perforated	4						
	Fluid	5						
	Bloody	6						
	No movement w/Valsalva	7						
13	**Skin**							
	Normal	1						
	Redness	2						
	Pale	3						
	Rash	4						
	Itch	5						
	Abrasions,	6						
	Lacerations	7						
	Bruising	8						
	Burns	9						
	Skin infection	10						

PHS-pre-EVA-2 (Is conducted per day EVA)

1. Clinical Evaluation

Date							
Time							
Crewmember's ID							
Examiner's ID							
1	**Blood Pressure**						
2	**Pulse**						
3	**Respiratory Rate**						
4	**Temperature Celsius**						

2. BMM – The onboard instruction MO book 2, Sec. 3.8 page 3-42

3. Urinalysis - The onboard instruction MO book 2, Sec. 3.9 page 3-53

PHS-pre-EVA-1 (Is conducted 1-2 days prior to EVA)

Date								
Time								
Crewmember's ID								
Examiner's ID								
1	**Blood Pressure**							
2	**Pulse**							
3	**Respiratory Rate**							
4	**Temperature Celsius**							
5	**Medications Taken**							
	No	1						
	Yes (report FS via PMC)	2						
6	**Complaints**							
	No	1						
	Yes (report FS via PMC)	2						
7	**Sleep Duration (hours)**							
8	**Quality of Sleep**							
	Normal Deep(sound), uninterrupted	1						
	Interrupted	2						
	Insomnia	3						
9	**Fatigue**							
	Absent	1						
	Occurs at end of day, relieved with sleep	2						
	Not relieved with sleep.	3						
10	**Nose**							
	Normal	1						
	Congestion	2						
	Discharge	3						
	Bleeding	4						
11	**Mouth and Throat**							
	Normal	1						
	Swelling	2						
	Redness	3						
	Changes in Tonsils	4						

12	**Ears-Tympanic Membrane**							
	Normal	1						
	Redness	2						
	Deformation	3						
	Perforated	4						
	Fluid	5						
	Bloody	6						
	No movement w/Valsalva	7						
13	**Skin**							
	Normal	1						
	Redness	2						
	Pale	3						
	Rash	4						
	Itch	5						
	Abrasion	6						
	Lacerations	7						
	Bruising	8						
	Burns	9						
	Skin infection	10						

PHS-pre-EVA-2 (Is conducted per day EVA)

1. Clinical Evaluation

Date							
Time							
Crewmember's ID							
Examiner's ID							
1	**Blood Pressure**						
2	**Pulse**						
3	**Respiratory Rate**						
4	**Temperature Celsius**						

2. BMM – The onboard instruction MO book 2, Sec. 3.8 page 3-42

3. Urinalysis - The onboard instruction MO book 2, Sec. 3.9 page 3-53

5.3. POST-EVA EXAMS

PHS-post-EVA-1 (Is conducted at once after EVA-suit doffing)

1. Clinical Evaluation

Date								
Time								
Crewmember's ID								
Examiner's ID								
1	**Blood Pressure**							
2	**Pulse**							
3	**Skin**							
	Normal	1						
	Redness	2						
	Pale	3						
	Rash	4						
	Abrasions	5						
	Lacerations	6						
	Bruising	7						
	Nail trauma	8						

NOTE

If clinically indicated, perform fool exam PHS-post-EVA-2 (see page 5-18)

PHS-post-EVA-2 (Is performed only is clinically indicated)

Clinical Evaluation

4	**Respiratory Rate**							
5	**Temperature Celsius**							
6	**Complaints**							
	No	1						
	Yes (report FS via PMC)	2						
7	**Nose**							
	Normal	1						
	Congestion	2						
	Discharge	3						
	Bleeding	4						
8	**Mouth and Throat**							
	Normal	1						
	Swelling	2						
	Redness	3						
	Lesions	4						
9	**Ears-General**							
	Normal	1						
	Drainage	2						
	Redness	3						
	Wax Buildup	4						
10	**Ears-Tympanic Membrane**							
	Normal	1						
	Redness	2						
	Deformation	3						
	Perforated	4						
	Fluid	5						
	Bloody	6						
	No movement w/Valsalva	7						

11	**Eyes-Lids**							
	Normal	1						
	Redness	2						
	Swelling	3						
	Lesion	4						
	Itch	5						
	Crusting	6						
	Swelling around eyes (Periorbital Edema)	7						
12	**Eyes- Conjunctiva**							
	Normal	1						
	Redness	2						
	Hemorrhage	3						
	Tearing	4						
	Dryness	5						
13	**Chest**							
	Normal	1						
	Asymmetric appearance	2						
	Asymmetric movement	3						
	Shallowing breathing	4						
	Deep breathing	5						
14	**Lungs**							
	Normal	1						
	Coarse breath sounds	2						
	Decreased/Weak Respiration	3						
	Crackles	4						
	Wheezing	5						
	Rales (fluid sounds)	6						
15	**Heart**							
	Normal	1						
	Murmur	2						
	Irregular	3						

16	**Upper Extremities**							
	Normal	1						
	Asymmetric Strength	2						
	Altered ROM	3						
	Tenderness	4						
	Swelling	5						
	Redness	6						
	Bruising	7						
	Lesions	8						
17	**Lower Extremities**							
	Normal	1						
	Asymmetric Strength	2						
	Altered ROM	3						
	Tenderness	4						
	Swelling	5						
	Redness	6						
	Bruising	7						
	Lesions	8						

2. BMM – The onboard instruction MO Book 2 Sec. 3.8 page 3-42

3. Urinalysis - The onboard instruction MO Book 2 Sec. 3.9 page 3-53

PHS-post-EVA-1 (Is conducted at once after EVA-suit doffing)

1. Clinical Evaluation

Date								
Time								
Crewmember's ID								
Examiner's ID								
1	**Blood Pressure**							
2	**Pulse**							
3	**Skin**							
	Normal	1						
	Redness	2						
	Pale	3						
	Rash	4						
	Abrasions	5						
	Lacerations	6						
	Bruising	7						
	Nail trauma	8						

N O T E

If clinically indicated, perform fool exam PHS-post-EVA-2 (see page 5-22)

PHS-post-EVA-2 (Is performed only is clinically indicated)

Clinical Evaluation

4	**Respiratory Rate**							
5	**Temperature Celsius**							
6	**Complaints**							
	No	1						
	Yes (report FS via PMC)	2						
7	**Nose**							
	Normal	1						
	Congestion	2						
	Discharge	3						
	Bleeding	4						
8	**Mouth and Throat**							
	Normal	1						
	Swelling	2						
	Redness	3						
	Lesions	4						
9	**Ears-General**							
	Normal	1						
	Drainage	2						
	Redness	3						
	Wax Buildup	4						
10	**Ears-Tympanic Membrane**							
	Normal	1						
	Redness	2						
	deformation	3						
	Perforated	4						
	Fluid	5						
	Bloody	6						
	No movement w/Valsalva	7						

11	**Eyes-Lids**							
	Normal	1						
	Redness	2						
	Swelling	3						
	Lesion	4						
	Itch	5						
	Crusting	6						
	Swelling around eyes (Periorbital Edema)	7						
12	**Eyes- Conjunctiva**							
	Normal	1						
	Redness	2						
	Hemorrhage	3						
	Tearing	4						
	Dryness	5						
13	**Chest**							
	Normal	1						
	Asymmetric appearance	2						
	Asymmetric movement	3						
	Shallowing breathing	4						
	Deep breathing	5						
14	**Lungs**							
	Normal	1						
	Coarse breath sounds	2						
	Decreased/Weak Respiration	3						
	Crackles	4						
	Wheezing	5						
	Rales (fluid sounds)	6						
15	**Heart**							
	Normal	1						
	Murmur	2						
	Irregular	3						

16	**Upper Extremities**							
	Normal	1						
	Asymmetric Strength	2						
	Altered ROM	3						
	Tenderness	4						
	Swelling	5						
	Redness	6						
	Bruising	7						
	Lesions	8						
17	**Lower Extremities**							
	Normal	1						
	Asymmetric Strength	2						
	Altered ROM	3						
	Tenderness	4						
	Swelling	5						
	Redness	6						
	Bruising	7						
	Lesions	8						

2. BMM – The onboard instruction MO Book 2 Sec. 3.8 page 3-42

3. Urinalysis - The onboard instruction MO Book 2 Sec. 3.9 page 3-53